THE IRON AGE

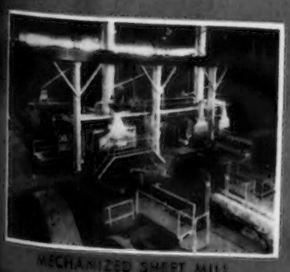
Editorial Index, Page 55

ANNEALING FURNACES

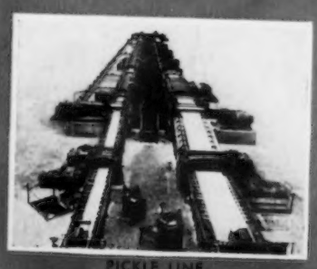
BACKED UP LEVELLER FOR WIDE SHEETS

ELECTROLYTIC LINE

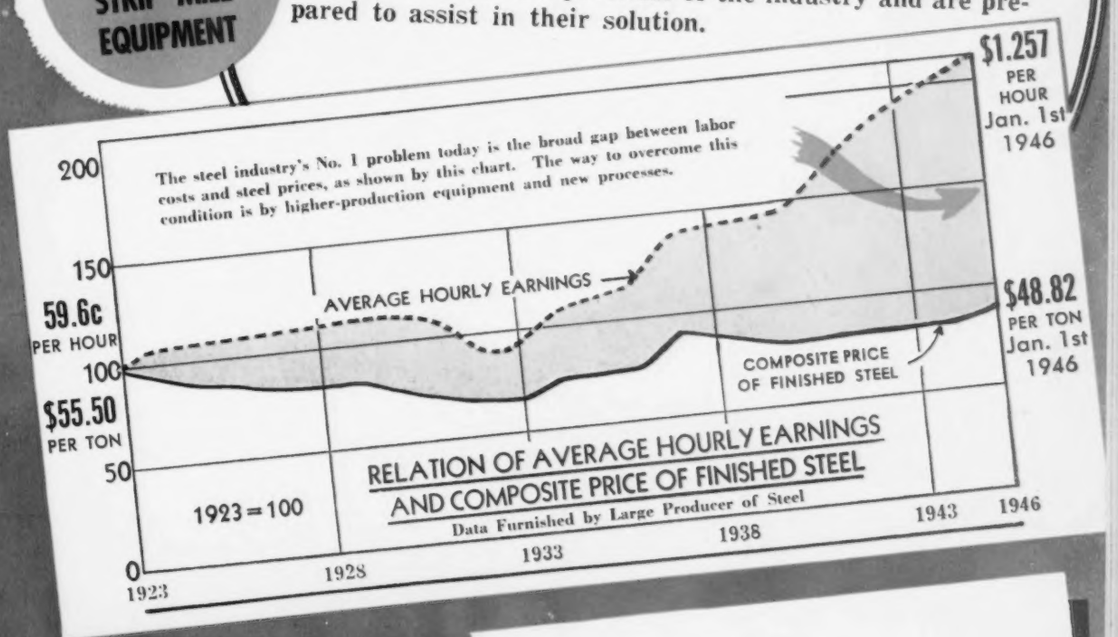
TIN PLATE SHEARING



MECHANIZED SHEET MILL



PICKLE LINE



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THIS WEEK IN THE

IRON AGE

Vol. 157, No. 19 May 9, 1946

Editorial

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Technical Articles

o o o

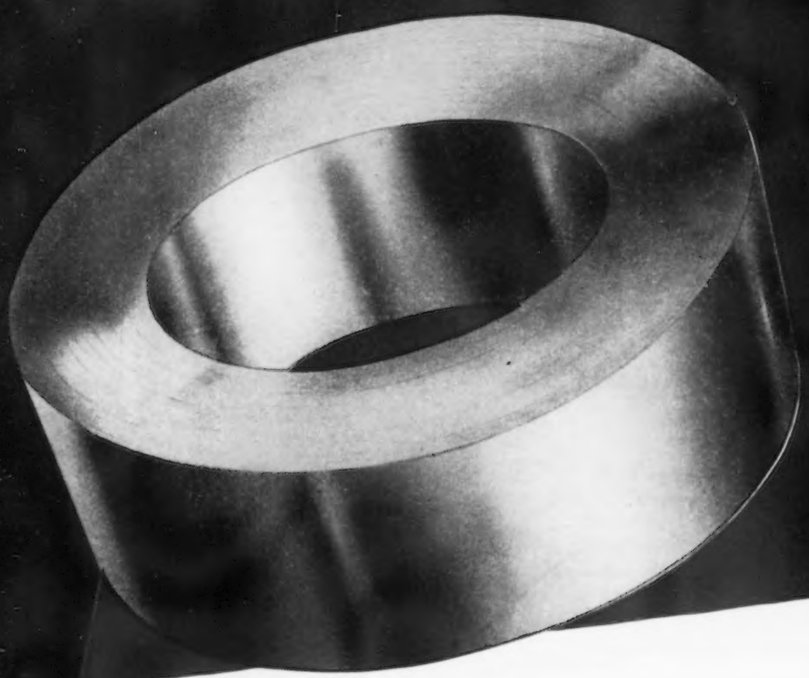
Features

o o o

News and Markets

o o o

SHARONSTEEL



Where weather resistance in service is desirable, fabricators prefer Sharon Galvanite. It is a hot dip zinc coated strip that provides the maximum protection against rust.

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Galvanite is furnished in long coils or in cut lengths. Widths range up to 22 inches.

Contact the nearest Sharon field office, or the company's home office today to learn more about the advantage of Galvanite and other special coated Sharon steels.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

THE
IRON AGE

ESTABLISHED 1855

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May 9, 1946

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Golden Slippers

AMERICAN foundrymen from all parts of the country are putting on their golden slippers this week to climb the stairs and pace the miles of aisles in the Cleveland Auditorium. The occasion, as you undoubtedly know, is the American Foundrymen's Association Golden Jubilee Congress.

It is a far cry from safety shoes to golden slippers but not any farther than the distance as measured in progress in casting during that period. Comparisons, of course, are invidious and all industries have made marked progress during the past half century. But it is not amiss to say that particularly during the past 10 yr this comparatively young member of the metalworking family has been showing its heels to some of its older brothers.

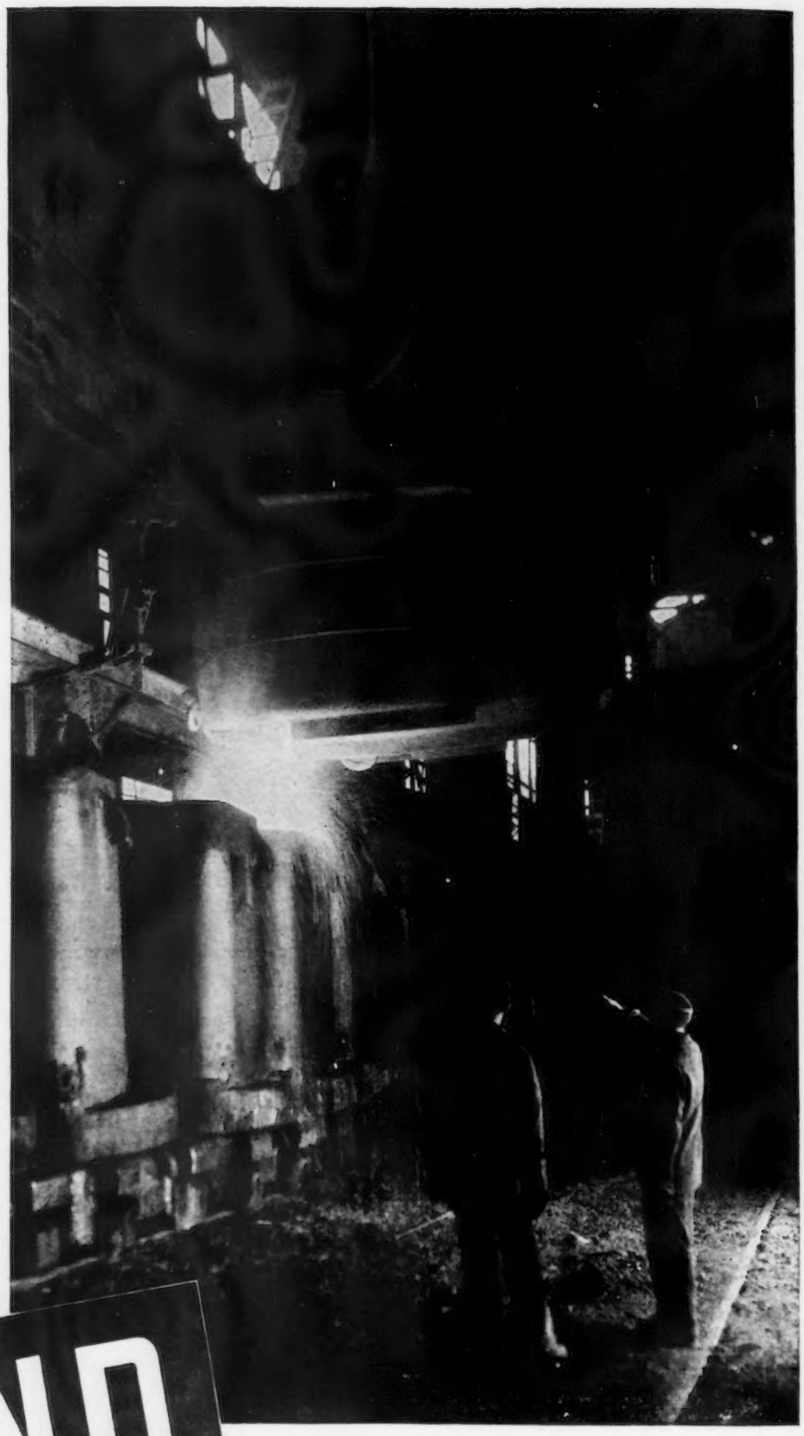
As a matter of fact, the art of casting metal is an infant industry in relative age although not in size. Its older brother, the art of forging, dates back to the very beginning of recorded history. Tubal Cain, seventh generation from Adam, according to the fourth chapter of the Book of Genesis, was a forger of every cutting instrument of brass and iron. This goes back, so the Good Book tells us, to 4500 B.C. And steelmaking is recorded by Herodotus in 500 B.C., some 40 centuries later. It was not until about A.D. 1400 that the casting of metal joined the procession of progress.

If we represent the eldest brother, forging as an adult of 64 years of age, then in proportion, steelmaking is a youth of 24 and casting is a child of five.

It is indeed a husky infant and one that has put on more than 10 million tons of weight during the past few years.

But this industry has done more than put on or put out weight. Its progress is no longer measurable in tons as it used to be but to the inclusion of ideas which have made one ton far different from another. Who, for example, could have imagined a quarter of a century ago the coming of today's high tensile iron castings with tensile strength after heat treating of 112,000 lb or more? Or of precision casting coming from the molds with an accuracy of 0.002 in. or better? Or the conception of various gases as alloying agents, or indeed the great procession of metallic alloying elements that produce characteristics in iron products almost as varied as are human personalities.

Greatest asset of the casting industry is its flexibility. No matter how illegible your signature may be, write it in the sand and the molten metal will faithfully follow its convolutions. No other art or process is capable of making metal take such an infinite variety of shape and form in three dimensions. And no other art finds its potential markets so broadly distributed over the entire range of material applications.



Pouring ingot molds at Inland's Indiana Harbor Plant.

New Steels

Our modern, changing world is placing new demands on steel—with particular emphasis on the high-strength, low-weight ratio; durability, uniformity and appearance. As a result, better steels, more versatile and adaptable than ever before, are being developed—some far in advance of the newer uses and improvements they eventually bring about.

Typical result of this intensive research program at Inland is "Hi-Steel" . . . solution to numerous high-strength, low-weight ratio requirements in steel construction problems. Daily, Inland metallurgists are engaged in solving current and long-range material problems of Industry. From this experience and from the continuing research program, come the greater achievements of tomorrow.

We will be glad to work with you on any problems concerning the selection or fabrication of steel.

INLAND STEEL

Inland Steel Company, 38 S. Dearborn Street, Chicago 3, Ill. *Sales Offices:* Cincinnati • Detroit Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul.

Principal Products: BARS • STRUCTURALS PLATES • SHEETS • STRIP • TIN PLATE PILING • REINFORCING BARS • RAILS TRACK ACCESSORIES.

► Because of conditions imposed by most bidders for the Geneva steel plant, it seems likely that U. S. Steel has the greatest chance to acquire this plant. Only rub may be whether Dept. of Justice objects on the grounds of conflict with anti-monopoly statutes.

► The lead shortage is seriously making itself felt in the petroleum industry. With stringent restrictions on the use of lead for tetraethyl compounds, many cracking and distillation plants have had to curtail their output of other petroleum derivatives. Yet demand for petroleum products is only 5 pct below peak demand during the war.

► Within about three months the Dept. of Interior will begin conferences with industry in order to reach some agreements as to the state of the nation's resources. It is hoped that out of these meetings will come a program of conservation, substitution and imports.

Preparatory to this conference, the department is conducting an inventory of the nation's raw materials.

► New starts in the housing program have surpassed estimates by 12 pct. During the first quarter of this year, 150,000 dwelling units were begun.

Houses begun during the second quarter will average $1000 less in price than in the first quarter. This, however, is not due to lower building costs but to the building of lower-priced housing.

► Two new Rossi continuous casting machines are being built in England. One, for ICI, is to cast 20-in. rounds and 10x40-in. slabs of aluminum and magnesium. Another is the 10-in. brass unit for James Booth, Ltd.

A number of new Rossi continuous casting units are now being negotiated for the United States.

► With the coal strike being the least publicized yet one of the most disastrous from the standpoint of recovery, many observers lose sight of the fact that John L. Lewis, according to past performances, has one principal objective--to get his demands. Whatever else may stem from this one goal evidently concerns him not at all.

► Carnegie-Illinois' president, J. Lester Perry, voiced last week what many insiders have believed for some time, namely that Pittsburgh has lost some of its steel market advantages.

He also inferred that some future steel mill and equipment replacements might be located elsewhere. It would be perfectly safe to assume he had his own company in mind.

► One of the effects of the steel and coal strikes on the steel industry has been the irrevocable loss of two months' production. Had there been no strikes, the steel industry would have been in position to produce the largest peacetime tonnage in history--about 83 million tons. Only by the utmost exertion now will it be able to produce even 73 million tons.

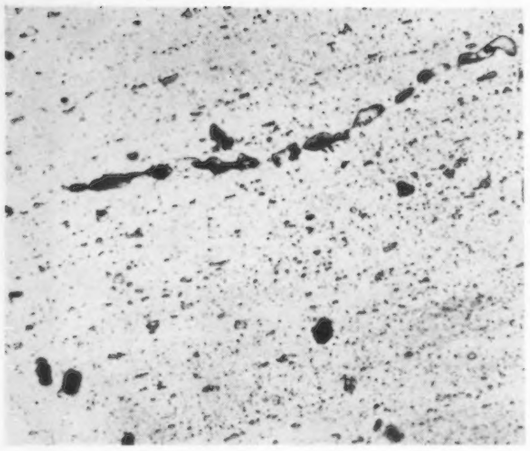
► Superior Steel Corp., is starting a rebuilding program at its Carnegie, Pa., plant, which will probably take it completely out of the hot-rolled strip business and develop to a high degree its stainless flat rolled facilities. Financing is underway now, but it will be some time before actual work begins at this plant.

► Steel Craft in Connecticut has reached a weekly output of 25 all-welded alloy steel pleasure craft. It is understood that the company has cut the price substantially below that of competing companies making boats in the traditional manner.

► A test for weld quality which the boat is subjected to involves the filling of the craft with ice and dropping it from a height of 30 ft. In another test, the boat is run aground at top speed.

► Only sixty British families earned $24,000 or more after taxes during the war years. In prewar years there were 7000 in this class.

High Temperature



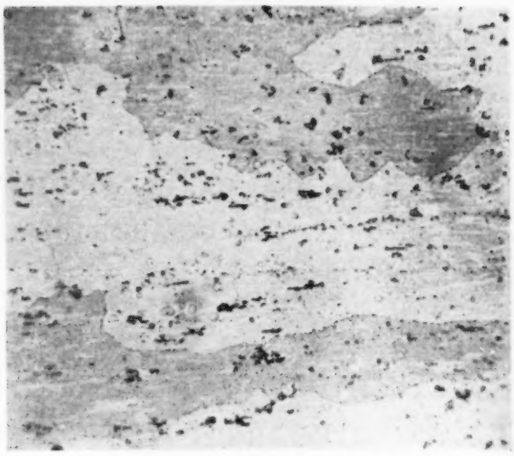


FIG. 1 — (Left) Structure of 14S-T forging with severe high temperature oxidation — slight Keller's etch. (Right) Normal microstructure of 14S-T forging. Keller's etch. (Both 250X)

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PROBABLY the greatest cause for the rejection of aluminum alloy forgings by aircraft companies during the war was a metallurgical phenomenon called high temperature oxidation. This defect, often abbreviated and referred to simply as h.t.o., damaged thousands of dollars worth of forgings and caused an immense loss of time, to say nothing of the ill feeling that occasionally resulted between vendor and aircraft manufacturer. The damage this imperfection caused was noticeable largely through the loss in physical properties to below specification limits, rendering the forgings rejectable, and incurring considerable cost and time in the reordering and refabrication of additional units.

The design requirements of modern aircraft employing highly stressed forged members makes it imperative that the utmost in quality is received. Since various lots were rejected from time to time not on the basis of the physical properties being below requirements, but on the basis that h.t.o. (high temperature oxidation) "impaired the quality," some feeling of unfairness was voiced by vendors.

Since this defect occurs with frequency and is of obvious importance as a defect, and, further, as it is difficult to interpret correctly, a knowledge of its occurrence, appearance and its effect in all degrees of severity should help to provide a better understanding.

The most widely used alloy for aluminum forgings, and the one concerned here, is designated as Alcoa 14S, which combines high strength and toughness with ease of fabrication. In addition to aluminum there exists nominally 4 pct Cu, 0.5 pct Mg, 0.5 pct Mn and controlled impurities of Fe and Si of approximately 0.5 pct and 0.9 pct respectively. This alloy is thus of the generally accepted group called duralumin, owing its high strength and hardness values to the solution and precipitation properties of the elements involved in combination with the aluminum.

The alloy is first made up in openhearth furnaces of 20,000 lb or greater capacity and cast into cylindrical billets of various sizes suitable for extrusion. Since the greater percentage of forgings are made directly from extruded stock rather than from the cast or rolled state, only this method of manufacture is considered here. After a homogenizing anneal treatment at a temperature in excess of 900°F for considerable time, the billet is completely softened ready for the extrusion mill where it is extruded in the plastic range (650°F to 800°F) to various sized rod or bar stock.

Pre-determined lengths of stock are heated again to the plastic range for the forging operation and worked in single or multiple step dies, or by hand, to the desired shape in vertical steam pressure hammers. After the flash and tong ends are trimmed off, the forgings are heat treated.

Heat treatment consists of a solution treatment of from 4 hr to 12 hr at 940°F-960°F and a quench in water or caustic at 150°F. An aging treatment of 320°F for 18 hr or its equivalent follows. After an inspection the forgings are ready to ship. This is the usual plant routine in the manufacturing process, but in the evolution of this process certain defects were discovered, one of them being high temperature oxidation.

In the early days of heat treating aluminum alloys, fused sodium nitrate baths were used to insure even temperature distribution and freedom from harmful atmospheres. The latter accomplishment was more accidental than sought for at the time. Since then gas fired and electric furnaces have come to the fore and a necessary control of furnace atmospheres developed from the discovery that certain constituents were oxidizing during the heat treat cycle causing a weak bond in the material.

According to Stroup,[1] h.t.o. may occur when there is present in the atmosphere: (1) Excessive moisture, as in summer air with high humidity; (2) small traces of sulfur compounds; (3) a mixture of 25 pct combustion products and air, and (4) temperatures above the maximum allowable. The section thickness and length of time at temperature greatly affect the severity of attack. The possibility of h.t.o. thus can be minimized by close attention to temperature control, avoidance of sulfur compounds, excessive air to combustion ratio in the atmosphere, and a high moisture content.

On foggy mornings or days when high humidity

Oxidation in Aluminum Alloy Forgings

By LAWRENCE J. BARKER
Metallurgist,
North American Aviation, Inc.,
Inglewood, Calif.

The mechanism of high temperature oxidation in 14S-T aircraft forgings, its causes, prevention, appearance and effect, are discussed in this article. A method of classifying the severity of this defect, in terms of its effect upon physical properties, to avoid unnecessary rejections is also covered.

is present, the use of Alorco[2] protective compound (a powder, placed in the furnace charge, which volatilizes, forming a gaseous film over the parts) will do much to prevent this attack. Due to chemical composition, other alloys such as 24S, 53S, etc., are more susceptible to attack than 14S, but forgings, due to their relatively greater bulk, require a longer soaking period, thus enhancing the possibility of some oxidation.

[1] *"Atmospheric Control in the Heat Treatment of Aluminum Products," P. T. Stroup, Aluminum Research Laboratories, Oct. 15, 1941.*
[2] *Product of Aluminum Ore Co., a subsidiary of Aluminum Co. of America.*

A 14S-T alloy forging derives its main strength and hardness from the phenomenon of precipitation within the solid state. Cu and Mg in the percentages given previously are completely soluble in Al at the elevated temperatures of heat treatment. Upon quenching these elements are retained in solid solution but immediately begin to precipitate out, mainly in the form of $CuAl_2$ with some Mg_2Si, into the slip planes and grain boundaries acting as keying agents against slip. The artificial aging treatment hastens this process and causes agglomeration of these constituents into larger but often still submicroscopic sizes.

The normal as-cast microstructure shows the dendrytic form and the scattered constituents of $CuAl_2$, and Al-Cu-Fe-Mn. The extrusion process breaks this structure down into stringer formations of the constituents and elongated grains which are again broken up and recrystallized after forging. Upon full heat treatment, the solid solution (with precipitation) is apparent in the microstructure (grain contrast) with some undissolved $CuAl_2$ and Al-Cu-Fe-Mn in the grain boundaries and throughout the grains. This normal microstructure is shown in fig. 1 (left).

This normal microstructure of 14S-T forged material is markedly changed by the occurrence of high temperature oxidation. Instead of the usual $CuAl_2$ or occasional Mg_2Si constituents in the grain boundaries, there exists oxidized material which shows up as black globules or round voids. The simplest way to detect these areas is to examine the structure first in the as-polished condition, noting any such particles, then lightly etching the samples with Keller's[3] etch and re-examining. If any constituents are seen in the grain boundaries such as are shown in the photomicrographs, figs. 2, 3 and 4, the certainty of h.t.o. can be established.

Overheating the material during heat treatment will cause eutectic melting in the grain boundaries and form eutectic rosettes in the microstructure, as indicated in fig. 6. If overheating has been at all severe this melting may be easily detected. However, the formation of rosettes alone will not definitely establish the certainty of overheating since various forms of preheating extrusion ingot will likewise cause rosettes.

[3] *2.5 pct HNO_3, 1.5 pct HCL and 1.0 pct HF in water—Normal etching consists of 15 sec immersion.*

Since any oxidized material in the grain boundaries will be preferentially attacked during a caustic quench or etch and show V shaped valleys around the grains on the surface of the forgings, the possibility of high temperature oxidation can readily be detected with the naked eye. Very slight oxidation may have no effect on the surface but as the deterioration increases in severity, the appearance will be more marked. Figs. 2, 3 and 4 show three separated degrees of oxidation as indicated on the surface. Heavy or extreme oxidation, and burning or severe overheating during the heat treatment may even cause a grain protrusion or separation as in fig. 5.

This usual appearance may be obscured by the use of improper quenching and cleaning methods, sandblasting or over-caustic etching. However, this is not generally the case and the surface of a forging will usually be a reliable indicator as to the possibility of oxidation.

Blisters, too, as shown in fig. 6 can give indications of h.t.o. since the expansion of the boundaries next to the surface can cause a local raised spot. Often blisters are formed by over-heating due to the expansion and rejection of the locally formed liquid phase. However, blisters can be caused by other factors such

TABLE I

Average Properties of Al Forgings With Classified Degrees of H.T.O.

Classification by Microscopic Examination Supported by Visual Surface Examination

Class Description	Yield Strength, Psi	Tensile Strength, Psi	Elongation, Pct in 2 in.
0 No h.t.o.	58,009	71,240	12.3
1 Slight h.t.o.	59,312	69,525	9.8
2 Medium h.t.o.	59,995	70,414	7.5
3 Severe h.t.o.	63,058	69,982	5.6

Appearance of varying degrees of high temperature oxidation in the forging and in the micrograph.

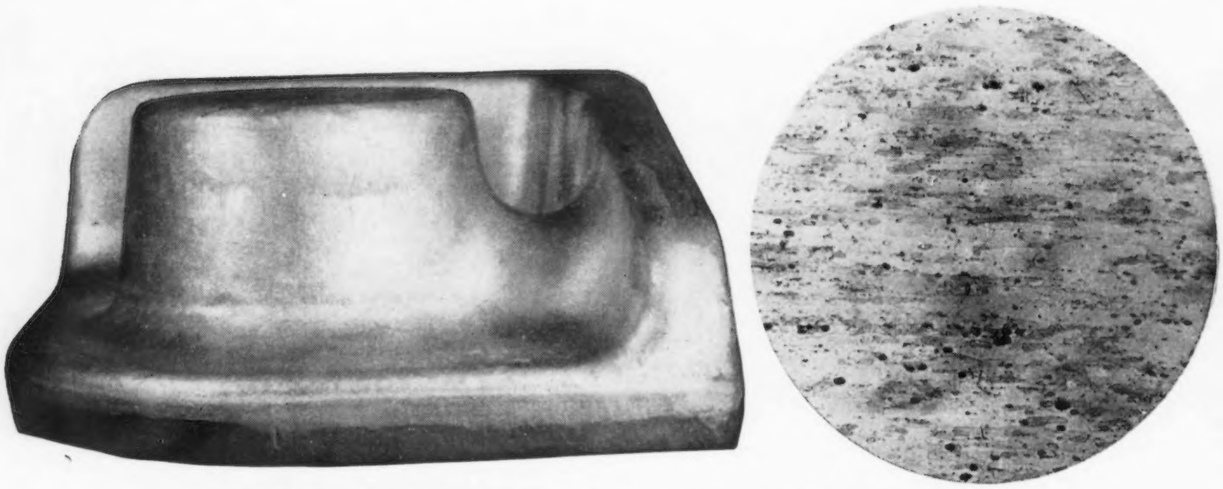


FIG. 2—Class 1, or slight, degree of h.t.o. Micrograph at 75X, Keller's etch.

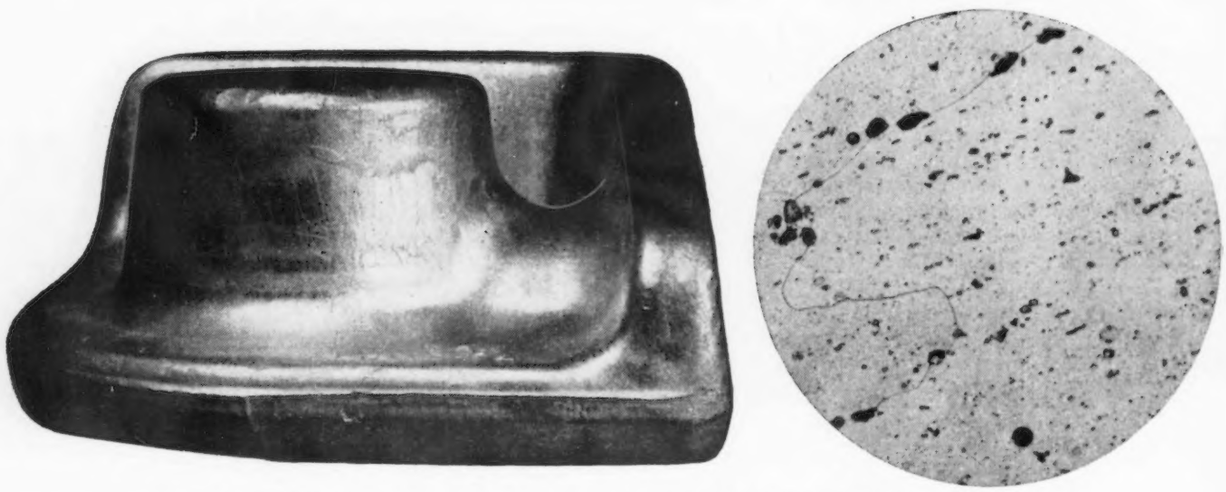


FIG. 3—Class 2, or medium, degree of h.t.o. Micrograph at 250X, Keller's etch.

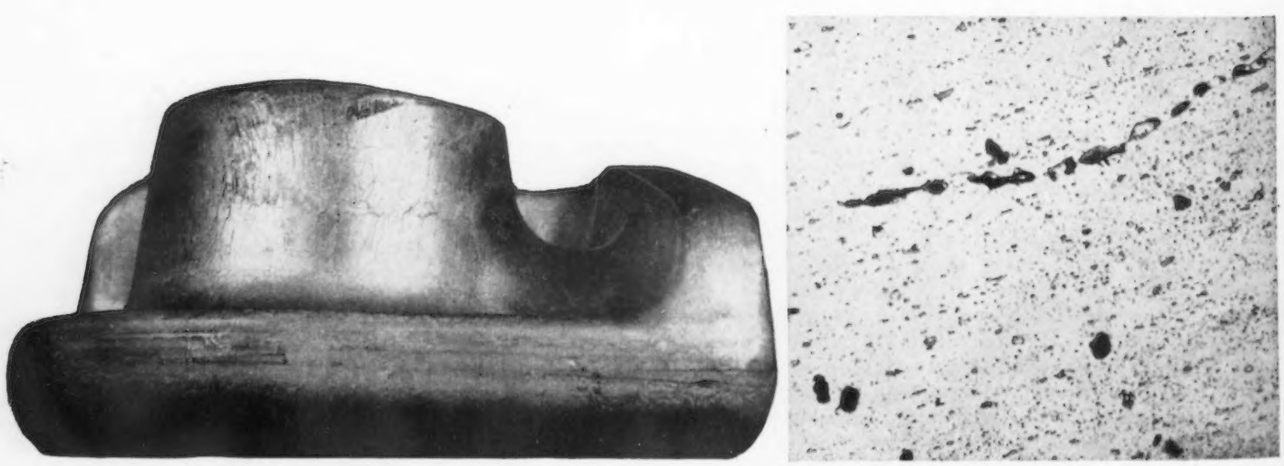


FIG. 4—Class 3, or severe, degree of h.t.o. Micrograph at 250X, Keller's etch.

as subsurface stringers of oxide film and flashed metal, and thus are not a definite indication without further investigation and support.

The physical properties, especially elongation values, have a direct relationship with the extent and severity of oxidation. As the oxidation becomes more intense the elongation becomes less. This property is more sensitive to the occurrence of oxidation than any of the other properties, making it the most reliable yardstick or measure of the intensity of h.t.o. Yield strength is affected much less by oxidation, but in some cases helps to verify the results indicated by a low elongation. Yield strength tends to become higher, approaching the ultimate strength, in an inverse ratio with the elongation. This is readily understandable since any change within the grain or grain boundary that reduces the plasticity of the material as a whole will cause a brittleness and consequent raising of the yield strength to a value more closely approaching the ultimate. An added effect is that the normal constituent is replaced by the harder oxide.

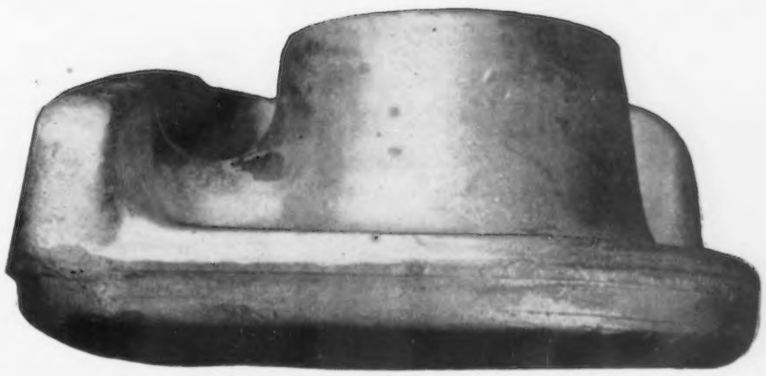


FIG. 5—Blisters on surface of forging caused by slight h.t.o. adjacent to surface and fairly localized.

There is a point at which the material becomes extremely brittle and the normal cohesive bond between the grains is so reduced by oxidation that both yield and tensile strengths as well as elongation are drastically lowered. This occurs only in the extremely severe cases which rarely occur in commercial practice. These cases are very noticeable before they reach the testing stage for the surface appearance is mute evidence of harmful practice.

Table I shows the average values for physical properties of four classes of h.t.o. The averages were obtained from the properties of both round and flat, standard 2-in. gage length test bars from at least 20 separate forgings in each classification. Tensile tests were conducted on a 20,000 lb Riehle machine with a Templin type electric extensometer and recorder using the 0.2 pct offset method to obtain the yield strength.

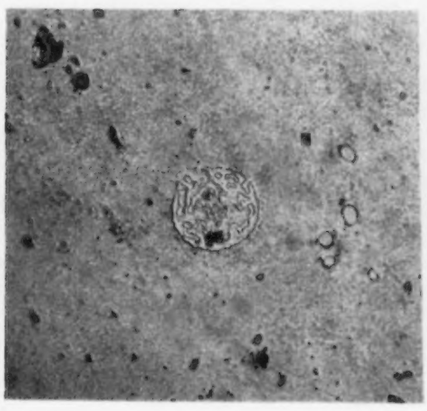
It has been noted that flat bars taken close to the outer surface of the forging will generally give lower elongation results than round bars, due to the fact that oxidation commences at the outside and gradually works inward, and the fact that the smaller the cross-sectional area the greater are the chances for a large percentage of oxidized material. Little affect has been noted on the corrosion resistance since the rate of quench will largely determine the difference in potential between boundary and grain.

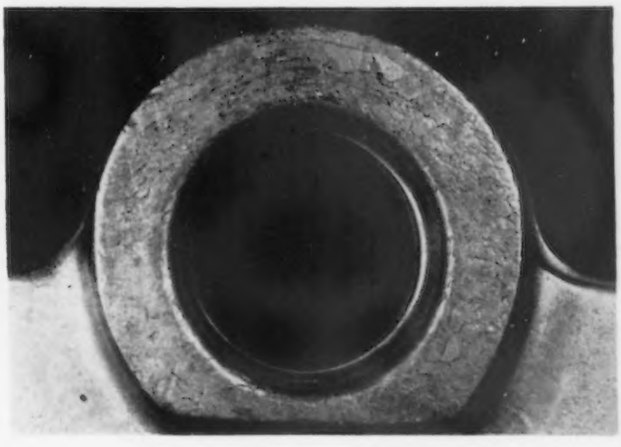
There are three related metallurgical inspection procedures in which h.t.o. can be detected. The establishment of these procedures to standardized inspection methods is helpful in preventing any defective material from being used.

Highly stressed aluminum forgings demand a 100 pct visual inspection for dimensional tolerance, cracks, laps, blisters, etc. If the surface of the forging is not such that a good examination can be made, then the following etch is recommended: 3 min in 10 pct solution of caustic at 160°F, followed by a water rinse, 1 min immersion in 30 pct solution of HNO_3 and another water rinse. Forgings that have been properly quenched in caustic will not usually require this treatment.

It is obvious from the photographs accompanying this discussion that any such appearances shown should give rise to concern over h.t.o. However, it might be well to stress that a condition does exist that will produce a grain boundary outline on the surface in the same manner. This occurs when the grain boundary contains an excessive amount of soluble material.

FIG. 6—(Right) Grain separation caused by severe overheating (slight macro-etch in mixed acid). (Left) Microstructure (750X) of section taken from the overheated forging shows eutectic rosette caused by overheating during heat treatment—slight Keller's etch.





mostly $CuAl_2$, that etches out in a caustic dip. It generally occurs only on large-grained forgings. Since the characteristic valley is U shaped rather than the sharp V of h.t.o., the difference can be detected by an inspector after a little experience.

In addition to a visual examination, forgings usually receive a tensile test, at least one test bar per lot. Any excessive amount of h.t.o. would immediately show up in this test in the failure to meet the physical properties required. If all physical properties are met there usually is no valid basis for rejection of the part, making this an important procedure.

If visual examinations or tensile tests have given indications of oxidation, a final and most reliable check is microscopic examination of a sample selected from the test bar or forging in question. Proof of h.t.o. in any appreciable amount can be easily established, as photomicrographs accompanying this article show.

A classification chart, table II, has been developed by North American Aviation to establish the relationship of the three inspection methods to each other and to the disposition of the case. This chart is also based on the results of over 20 separate tests of separate lots of forgings in each classification, representing data taken over a period of several months from forgings from numerous sources. For obvious reasons discretion must be used in passing judgment.

TABLE II

Classification of High Temperature Oxidation

Class Description	Surface Appearance	Tensile Tests	Microscopic Examination	Disposition
0.. None.....	Smooth	Satisfactory	Normal	Acceptable
1.. Slight.....	Slightly etched grain boundaries	Usually low elongations 8-10 pct	Scattered h.t.o. products	Generally acceptable
2.. Medium...	Plainly visible boundaries	Low elongations 6-8 pct	Grain outlines visible	Rejectable
3...Severe...	Definitely selectively etched	Elongations 2-6 pct	Coalescence of h.t.o. products. Sometimes burning	Rejectable

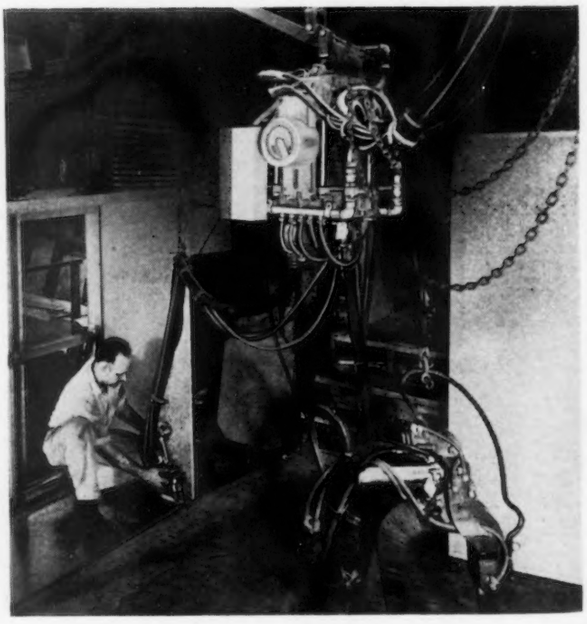
The results of physical tests supported by photomicrographs are considered the most significant.

Summarizing, proper control of sulfur, fuel ratio, and moisture in the furnace atmosphere, plus accurate temperature control and the use of Alorco protective compound will prevent h.t.o. from taking place. Detection is accomplished by three methods: Visual, microscopic and lowered elongation of test bars. Classification is necessary since complete perfection is never universal and some h.t.o. can be safely tolerated.

Portable Spot Welder Aids Small Manufacturer

USE of a single versatile, high production portable installation for spot welding has enabled the Vering Mfg. Co. of Los Angeles, to reduce production time fully 30 pct over former methods of assembly in the assembly of large refrigeration units. Vering, a small plant engaged in the manufacture of specialized refrigerators, freezer cases, beer coolers, walk-in coolers, etc., has also lowered the unit cost of these articles to a point where the plant can successfully compete with large, high volume production factories. The installation used at Vering was designed and produced by Progressive Welder Co., Detroit, and consists of two welding guns operating from a single transformer and with a single timer and air-hydraulic booster. Both guns can be operated in either vertical or horizontal position.

The entire assembly is mounted on a chain hoist which travels on an overhead trolley type conveyor, permitting the welding equipment to be moved quickly over a wide area and raised and lowered at will for welding in different positions. The transformer weight counterbalances the combined weight of the two guns. Both of the guns are of the scissors type. One of them has a short throat and the other a deep throat to permit reaching all the joints of the assembly. Progressive kickless welding cables are used, providing high cable flexibility and facilitating movement of the guns around the various subassemblies during the actual welding operations. The guns are also used for tack welding subassemblies prior to finish spot welding.



ASSEMBLING walk-in coolers by means of a portable spot welder has enabled one manufacturer to reduce production time 30 pct, and allows competition with mass production producers.

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Permanent Magnet Steels

A review of permanent magnet steels, covering their metallurgy, engineering possibilities, physical qualities and methods of fabrication is presented in this article. Among the materials covered, in addition to the older C, Cr and W types, are the Alnico group, Comol, Silmanal, Vectolite, Cunico and Cunife.

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By W. E. RUDER

In Charge, Metallurgy Div., Research Laboratory, General Electric Co., Schenectady

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Magnetic stands using a ring of Alnico V

ENGINEERING possibilities of permanent magnets lay dormant for many years, probably because none of the materials available were quite good enough to do much more than provide stable fields for instruments, meters, compasses and toys. Magnetos were probably as near to any power device as anything using substantial quantities of permanent magnet steels. • With the discovery and appreciation of the metallurgical principle of precipitation-hardening and its possibilities in producing *magnetic* hardening, a tremendous activity of interest and experiment developed both in this country and abroad. Before this, however, Honda had made the first real advance in permanent magnet quality in 1917 by adding approximately 35 pct cobalt to a variation of the then best alloy magnet steels. This gave the world a magnet steel about three times better than had been known before. At about $1.50 a lb for cobalt, this steel was rather expensive, but it soon made a place for itself as designers found ways to use it in flowmeters, phonograph pick-ups and other devices where weight, size and strength of field were important.

During the period roughly including 1928 to 1931 Kroll[1] in France, Koster[1] in Germany and Dean[2] in this country were experimenting with carbon-free alloys of such composition as iron-beryllium-nickel, iron-tungsten and iron-molybdenum. They showed that such alloys when properly heat treated had interesting permanent magnet properties that were at least as good as some of the quench-hardened permanent magnet steels.

[1] *Kroll, French patent* 669,551 (1929). *Koster, Stahl und Eisen* (1933), *vol.* 53, *p.* 849.
[2] *Dean, U. S. patent* 1,904,859 (1933).
[3] *Ruder, U. S. patent* 1,947,274 *and* 1,968,569 (1934).
[4] *Mishima, U. S. patent* 2,027,994-9 (1936).
[5] *Nesbitt, Metals Tech., Feb.* 1946. *U. S. Patent* 2,298,225 (1942).

The permanent magnet alloys, now generally known as the Alnicos[3], all variations of the basic aluminum-nickel-iron alloy system[4], have to date proved to have great industrial importance. These alloys vary in heat treatment and composition, depending upon the permanent magnet property most desired for any special application — coercive force, remanence, external energy or cost.

Although these alloys are pre-eminent in the field as far as magnetic quality goes, there are some applications where a malleable, ductile material may be desired, or where weight or extreme permanency is of paramount importance. To meet such needs other new compositions have been developed. Alnico is not forgeable, so must be cast to shape, or in the case of small or intricate shapes, produced by powder metallurgy methods. Fortunately, most magnet applications do not require high mechanical strength or ductility. For such as do, however, Cunife, Cunico, Comol, Silmanal and Vicalloy are available in the form of wire, strip, or rod. These will be discussed later.

Simple substitution of one of these new magnet materials in a device now using one of the older standard types is uneconomical for their characteristics differ in too many respects, even among themselves. Advantage in their use is gained only by correct design. The wide range in magnetic properties exhibited by permanent magnet materials now commercially available is best illustrated by the curves shown in figs. 1, 2 and 3. The significance of these curves may better be understood if we first consider a simple demagnetization curve, which is that part of the hysteresis loop which lies in the second quadrant between the B (flux) and the H (magnetizing force) axes (see fig. 4). In this figure B_r (residual), usually given in lines per sq cm, represents the number of lines that the magnet material can maintain in a closed magnetic circuit. H_c (coercive force), the point where the curve intersects the H axis, usually expressed in oersteds, represents the magnetizing force necessary to reduce the residual to zero, that is, completely demagnetize the magnet. The external energy curve, to the right of BO, is derived from the product $B_d x H_d$ for all points on the demagnetization curve and the value $(B_d H_d)$ max represents the point on the demagnetization curve for which a magnet

should be designed to obtain a desired air gap flux with the smallest volume of magnet material. It is evident, therefore, that the shape of the demagnetization curve as well as the values B_r, H_c and (B_dH_d) max must be considered in magnet design.

The relative importance of these values—H_c, B, and (B_dH_d) max—may be approximated by saying that high values of H_c are desired for designs having large air gaps, or subject to strong demagnetizing forces or vibration or external fields. For any given application the higher the H_c the shorter the magnet may be made. For high flux with small air gaps, or minimum cross section of magnet a high B_r value is desirable. For designs requiring the least volume of magnet material, high values of (B_dH_d) max should be selected.

Table I shows some typical values and characteristics of a number of commercially available permanent magnet materials. The magnetic properties and compositions listed are typical values. Properties will vary somewhat with size, shape, heat treatment and method of manufacture and use.

TABLE I

Properties of Permanent Magnets
Typical Values

Magnet Material	Nominal Composition (pct)	Form	Residual Br	Coercive Force Hc	External Energy (BdHd max)	Weight lb per cu in.	Mechanical Properties	Commercial Method of Fabrication
Carbon	1C, 0.5Mn, Bal. Fe	Bar	8,600	48	180,000	0.280	Hard, relatively strong	Hot forge, machine
Tungsten	5W, 1C Bal. Fe	Bar	10,300	70	320,000	0.292	Hard, relatively strong	Hot forge, cast, machine, punch, (thin sections)
Chromium	3.5Cr, Bal. Fe	Bar	9,000	63	290,000	0.280	Hard, relatively strong	Hot forge, cast, machine, punch (thin sections)
36 pct Cobalt	36Co, 3.5Cr, 3W, 1C, Bal. Fe	Bar	9,000	210	936,000	0.296	Hard, relatively strong	Hot forge, machine
Comol	12Co, 17Mo, Bal. Fe	Bar	10,000	225	1,100,000	0.295	Hard, relatively strong, but brittle	Cast, hot forge, machine, punch (thin sections)
Alnico 1	12Al, 20Ni, 5Co, Bal. Fe	Cast	7,100	400	1,400,000	0.249	Hard, brittle	Cast, grind
Alnico 2 (cast)	10Al, 17Ni, 12.5Co, 6Cu, Bal. Fe	Cast	7,200	540	1,600,000	0.256	Hard, brittle	Cast, grind
Alnico 2 (sintered)	10Al, 17Ni, 12.5Co, 6Cu, Bal. Fe	Sintered	6,900	520	1,430,000	0.245	Hard	Sinter, grind
Alnico 3	12Al, 25Ni, Bal. Fe	Cast	6,700	450	1,380,000	0.249	Hard, brittle	Cast, grind
Alnico 4	12Al, 28Ni, 5Co, Bal. Fe	Cast	5,200	700	1,300,000	0.253	Hard, brittle	Cast, grind
Alnico 5	8Al, 14Ni, 24Co, 3Cu, Bal. Fe	Cast	12,000	575	5,000,000	0.264	Hard, brittle	Cast, grind
Alnico 12	35Co, 18Ni, 6Al, 8Ti, Bal. Fe	Cast	5,800	950	1,750,000	0.260	Hard, brittle	Cast, grind
Cunife	60Cu, 20Ni, 20Fe	Wire	5,400	550	1,550,000	0.311	Ductile, malleable	Cold roll, machine punch
Cunico	50Cu, 21Ni, 29Co	Strip Rod Wire Cast	3,400	710	850,000	0.300	Ductile, malleable	Cast, cold roll, machine, punch
Vectolite	30Fe203, 44Fe304, 26Co203	Pressed pieces	1,600	900	500,000	0.100	Low strength, brittle	Sinter, grind
Silmanal	86.75Ag, 8.8Mn, 4.4Al	Rod Strip Sheet	550	Hci* 6,000	85,000	0.325	Workable	Machine, punch, cold roll
Vicalloy I	38.5Fe, 52Co 9.5V	Wire Rod, Sheet	8,800	290	1,100,000	0.296	Ductile, machinable	Cold roll, machine, wire draw
Vicalloy II	35Fe, 52Co 13V	Wire, Strip	10,500	450	3,300,000	0.293	Ductile, machinable	Cold roll, machine, wire draw

* Hci values are on the basis of intrinsic induction.

Alnico magnets, as the name implies, are, in general, alloys of nickel, aluminum, cobalt and iron of various compositions and treatments, made either by sand casting, precision casting, or sintering. They are hard, comparatively brittle and nonmachinable, so must be cast or pressed to shape and finished by grinding. Holes are usually cored in or, when relatively small, made by soft iron inserts which can be drilled out. The sintering method is usually used only for small—less than 1/10 lb—magnets of intricate shape. Alnico 2 when sintered is mechanically stronger and less brittle than when cast. This process is best adapted to mass production of small sizes. Slots, holes and grooves are made by the die and the resulting compact is fired to a high temperature in a pure dry hydrogen atmosphere. Because of greater strength, such parts as high speed rotors are usually made by this process. The other grades of Alnico, particularly Alnico 5 and 12, are not available in sintered form, but are produced in smaller sizes with close tolerances and fine detail surfaces by precision casting. Alnico 5 is unique among the aluminum-nickel-cobalt-iron base alloys in that its very favorable properties are obtained by cooling in a magnetic field as an essential part of the heat treatment. This means that its high quality is available only in the direction in which the field was applied during this heat treatment. Cunife, described later, is also highly directional in properties. In this case the cold-working direction is the controlling factor.

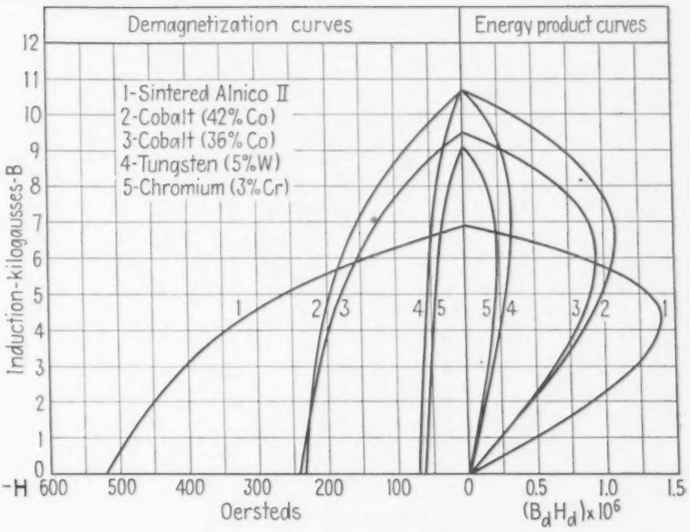


FIG. 1—A comparison of sintered Alnico with older types of permanent magnet materials.

Complete magnetization is essential for good quality. A magnetizing force of at least three times the H_c should be used. A field of 2000H is recommended for all Alnicos except Nos. 4 and 12. These require 3000H for best results.

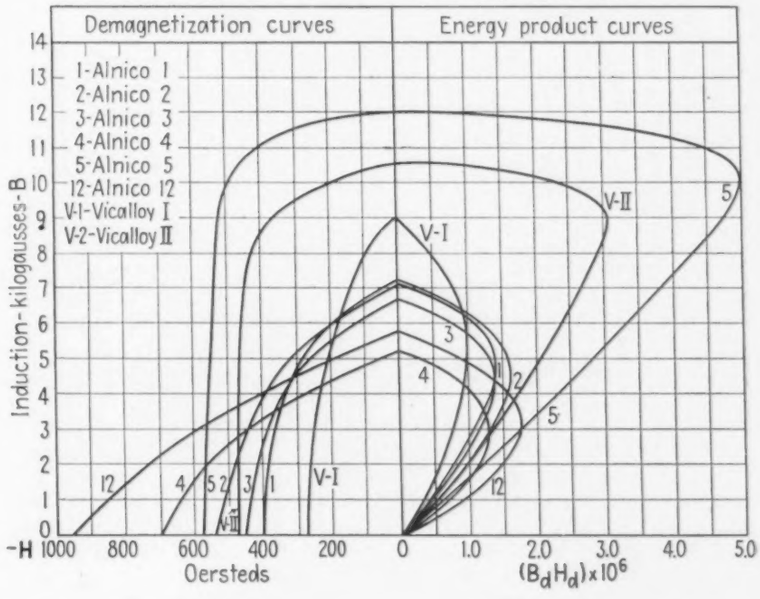
Another ductile, malleable permanent alloy series is described by Nesbitt[5] and known as Vicalloy (see table I and fig. 1). These alloys are principally iron-cobalt-vanadium. Vicalloy I contains about 9.5 pct vanadium and does not depend upon cold-working for its properties. Vicalloy II, with 13 pct vanadium, has a much higher energy product, which is obtained by heavy cold-working. It is therefore strongly directional in its properties, having its best properties in the direction of cold-working.

Cunife is a copper-nickel-iron alloy that is malleable, ductile and machinable, even in its age-hardened form. Cunife magnets are made from wire stock in round, square, or rectangular form. The round magnets are usually furnished in AWG sizes from No. 2 to 24. The wire also can be flattened to make thin, narrow shapes.

A wide variety of designs can be obtained by forming, drawing, punching or machining to shape. Cunife has directional properties and must be magnetized in the direction in which it was drawn. Since a high degree of cold reduction is necessary for quality, Cunife is better magnetically in the smaller sizes and only magnets less than 0.250 in. in diam are made from this material. It requires a magnetizing force of 2000 oersteds. In small sizes, Cunife has a tensile strength of approximately 120,000 psi. Its electrical conductivity is 9.2 pct that of copper. Cunife magnets have been used mainly in aircraft instruments, but their potential applications are practically unlimited.

Cunico 21 is a copper-nickel-cobalt alloy that is ductile, malleable and machinable. It has a lower residual induction, but a higher coercive force than Cunife and can be produced in a greater variety of forms than the copper-nickel-iron alloys. Cunico magnets are made from rod, strip or wire forms, but are usually furnished in their final shape only because they are age-hardened as the last step of their manufacture. Magnets are usually cut and machined from rods ¼ to 1 in. in diam. Although Cunico can be cast in sizes larger than a 1-in. rod, full magnetic qualities are not realized. Magnets made from strips of Cunico can be punched to any desired shape, prefer-

FIG. 2—Typical curves for cast-Alnico magnet materials.



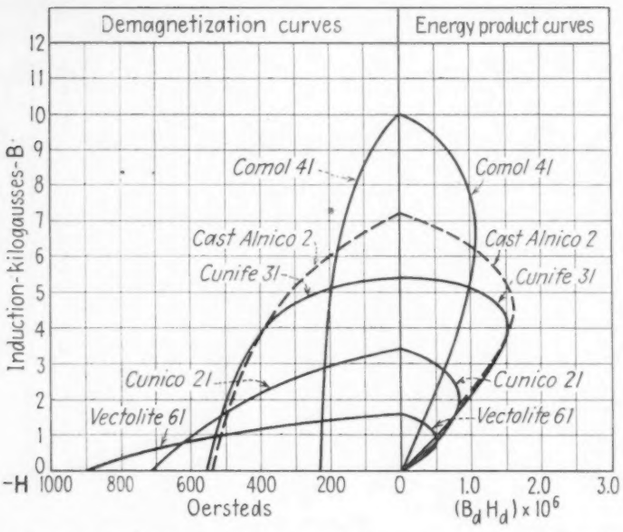


FIG. 3—Typical curves for some of the newer permanent magnet materials and the Vicalloys.

ably not exceeding 2 in. in width and 0.060 in. min, to 5/16 in. max in thickness. Like Cunife, magnets of Cunico can be fashioned from round wire in standard AWG sizes, ranging from Nos. 24 to 2, with normal tolerances. The wire, which can be made in square or rectangular sections also, is readily machined, drawn or formed to shape. It is recommended that Cunife rather than Cunico be used for magnets of 0.250-in. diam or less, because the former is better magnetically in small sizes.

Cunico, unlike Cunife, can be magnetized in any direction. In general, Cunico is better suited for magnets where a large cross-section is needed to produce sufficient total flux. Because of its high coercive force, less length is required to maintain the flux with Cunico than with Cunife or Alnico magnets (except Alnico 12). Cunico requires approximately 3200 oersteds for full magnetization.

Comol 41 is a magnetic alloy of cobalt, molybdenum and iron. It has good machining and fabricating qualities and has magnetic properties which are better than chrome, tungsten or cobalt magnets. Comol is cast to shape and, after proper heat treatment, is readily machined or drilled to close tolerances. It is better adapted to the casting of large magnets of simple contour than to small, intricate shapes. Holes in magnets are usually drilled after heat treatment rather than cored in the casting. Comol is also hot-rolled into thin sheet form from which magnet shapes can be punched.

When a high flux density is required in a short air gap, Comol is the natural choice for it has a high residual induction (10,000 gausses), a reasonably high coercive force (225 oersteds), and a maximum external energy of 1,100,000. In high-sensitivity instruments, Comol would have more stability than chrome or tungsten magnets, since its coercive force of 225 oersteds is higher than the 65 oersteds for chrome and the 70 oersteds for tungsten. Comol is also preferred over 36 pct cobalt, as it has higher flux density and external energy.

Vectolite 61 is a nonconducting material made from iron and cobalt oxides. The outstanding features of Vectolite magnets are: (1) lightweight, with a specific gravity of about half that of other solid-magnet materials; (2) high electrical resistivity of approximately 225 x 10^6 microohms per cm per cm sq, and (3) a coercive force higher than Cunico or any of the Alnicos (except No. 12).

Vectolite magnets are made by mixing powders of cobalt and iron oxides, pressing to shape, and sintering, a process similar to that used for sintered Alnico magnets produced is 1-sq in. cross section and approximately ¾-in. thickness. One of the smallest rotor magnets was 3/16 in. long and ⅛ in. outside diam with a 0.020 to 0.25-in. diam hole. Tolerances for as sintered magnets usually would not be more than ±0.015 in. on all dimensions. Although close tolerances are feasible, they must be decided upon for specific sizes and shapes.

Vectolite can be ground, with the proper technique. This material is weak mechanically and, therefore, is preferably sintered to final size. It has been used widely for rotor magnets for dc selsyns, tachometer indicators and other types of moving-magnet instruments. It is used as diametrically magnetized cylinders. To fully magnetize a Vectolite magnet, a magnetizing force of 3000 oersteds is required.

Silmanal is an alloy of silver, manganese and aluminum that has unusual magnetic properties for special applications. Because of its composition and heat treatment, it is one of the most costly magnet materials. This alloy is ductile, malleable and machinable. Magnets can be easily made from cold-drawn wire, swaged-rod forms or cold-rolled sheets. Silmanal is as readily machined as iron or steel and magnet shapes of wide variety can be made with very close tolerances.

The unusual magnetic properties of Silmanal greatly influence magnet design and application. Silmanal has a low residual flux (B_r = 550) and therefore, requires a much larger area to produce the same flux than most other permanent magnet materials. However, it has an extremely high coercive force (H_c of over 6000), and a consequent ability to withstand severe demagnetizing effects. Silmanal requires an extremely short magnet length for a given air gap, as compared with any other permanent magnet material. A typical shape for a Silmanal magnet is a thin disk, magnetized across the thickness. Silmanal requires a magnetizing force of 20,000 oersteds or 40,400 ampere-turns per in. of length, making long pieces difficult to magnetize.

Silmanal is used in applications where magnets are subjected to extreme demagnetizing effects, such as heavy ac fields. In instruments used for measuring the strength of permanent magnets, Silmanal is used as the moving element, for it can withstand strong magnetic fields without becoming demagnetized.

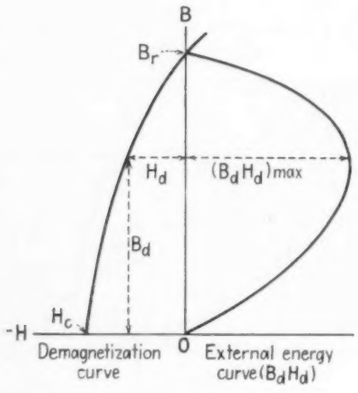


FIG. 4—Demagnetization and external energy curve for a typical permanent magnet material. At the point where B_dD_d is at the maximum, the volume of magnetic material required is the minimum.

Observation has long associated high retentivity and high coercive force with physical hardness. Modern theory recognizes Ewing's "elementary magnets" as small volumes, called domains, which are of the order of 10^{15} atoms in size and which form themselves by an alignment of magnetic moments of certain "free" electrons due to forces of exchange which are related to the distance between such electrons in neighboring atoms. These retain their internal magnetization, but the random orientation of these domains leaves no observable magnetization in the mass. When placed in an increasing external field, they gradually orient themselves to a position parallel to the applied field so that when the field is strong enough, they all point the same direction. Upon release from the external field, they tend to return to their original random state and are prevented only by the degree of strain existing in the crystal lattice. Such strains also result in physical hardness, hence the two usually go together in any given material. The coercive force, which is the field necessary to reduce the external flux to zero, is a measure of this internal strain. Treatment in a magnetic field at elevated temperature has the effect of adding the magneto-striction strain to those set up by structural changes. Total flux available is a function of the saturation of the material which depends upon the kind of atoms of which the domains are composed.

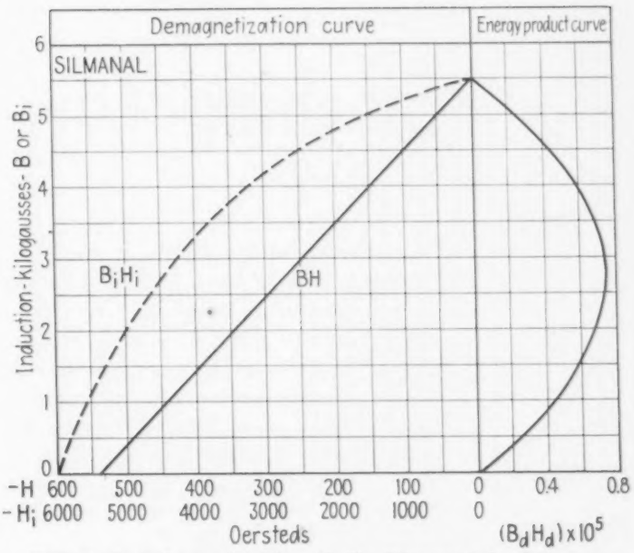


FIG. 5—Typical curve for Silmanal. The BH curve is for design use, while the BiHi line indicates the permanency of the magnet against demagnetization.

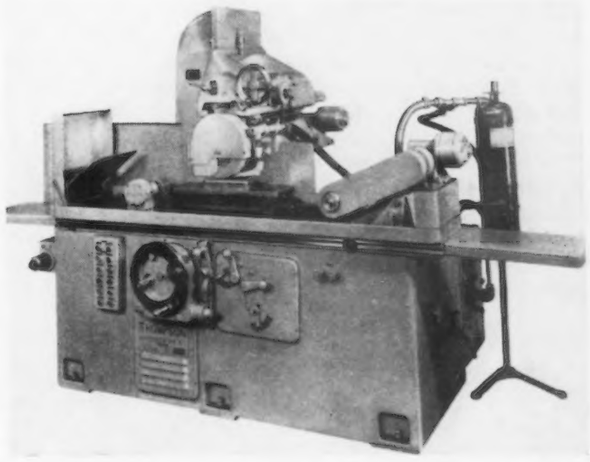
Our theories of magnetism and of the nature of the strains necessary to produce the best permanent magnets are still qualitative, but progress is being made.

Grinding Wheel Crusher Roll Life Extended

TWO master rolls are now provided on Thompson Truform grinders, manufactured by Thompson Grinder Co., Springfield, Ohio, which speed the production of precision flat form contours. One roll, the work roll, does the initial crushing and truing. The second roll, the reference roll, spindle mounted on the opposite end of the table, is used for touching up the wheel and correcting form loss.

The grinding wheel, which has been touched up on the reference roll, is run at grinding speed against the work roll, thus re-processing it right on the machine without disturbing the setup or removing anything. By this means, the work roll can be reground whenever it loses form, and can be used for hundreds of additional dressings, or until it is worn out. Duplicate master rolls can be ground in the same manner before production is started.

As an example, on a modified buttress thread form which had an 8-pitch form, a single master crushing roll provided only 125 dressings before the roll had to be reprocessed. Where two master rolls are used in the Thompson Truforming process, it was possible to obtain more than 15,000 dressings from the work crushing roll before it was worn out, or an increase of continuous production, without changing or disturbing the set-up, of 12,500 pct.



BY the use of two crusher rolls, a work roll and a reference roll, the life of these highly perishable items has been increased as much as 12,500 pct on the new Thompson Truform grinder.

On forms where the rolls provide fewer dressings, the ratio remains about the same, with similar economies in production cost and time. Thus, on a simple flat form contour working four pieces up and obtaining a production of 56 pieces between dressings, 250,000 pieces could be finished from a single work roll without disturbing the setup.

Smelting Low-Grade Ores by the

The Krupp-Renn process, a modification of the Walz process, is not new. Several plants were in operation some years before the war. At a time when reserves of high-grade iron ores are showing signs of serious depletion in the not far distant future, and when attention is being directed to the utilization of the vast quantities of low-grade ores in various countries, there is renewed interest in methods of smelting which are likely to render the employment of such ores commercially practicable. Details of the Krupp-Renn process, extracted from a captured German report, and a number of results of its applications are herein described in detail.

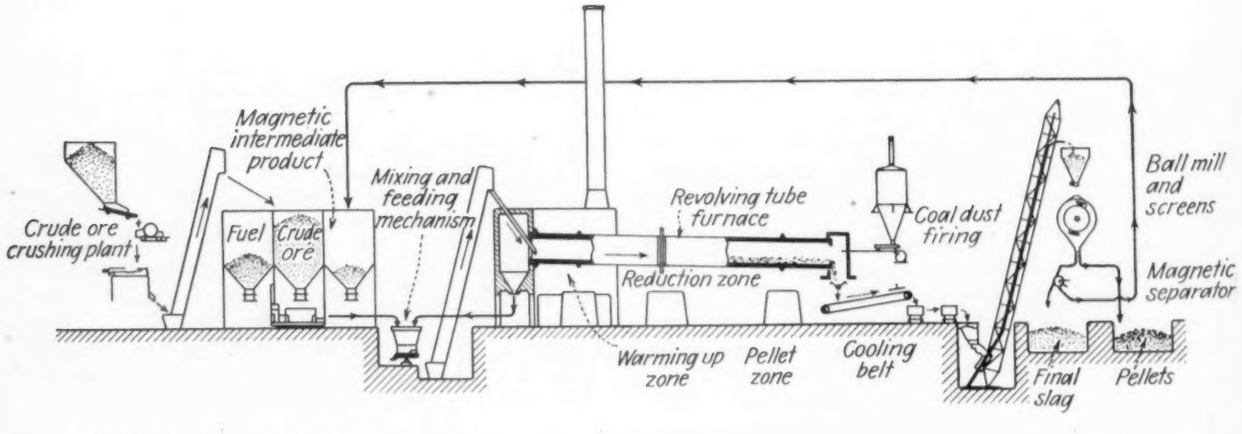
THE Krupp-Renn process is a continuous reduction process carried out in a revolving tube furnace which is designed in the first instance for the production of iron. The iron is reduced into a sponge and then converted into low-carbon metallic grains which are called pellets. As well as iron, different nonferrous metals can be prepared by this process, particularly those which possess a lower reduceability than iron and can form magnetic alloys or compounds with it, for example, nickel, cobalt, copper, in addition to silver, gold and platinum metals.

The operational sequence of the process is set out schematically in fig. 1. After the initial reduction in size to between 0.2 and 0.3 in., the ore and solid fuel are uniformly mixed together with the furnace dust and an intermediate product from the final crushing process, and the mixture continually fed into the tube furnace. The feed passes through the furnace in the opposite direction to the reduction gases. After a pre-heating in the waste gases the reduction of the metallic oxides to metal sponge takes place at a temperature of 1112° and 2012°F. In the last part of the furnace, in the pellet zone, the reduced sponge metal is welded up to form pellets which remain mixed with the semisolid slag. The cooled furnace product is separated, by means of crushing and magnetic concentration, into pellets, a final slag and an intermediate product which is returned to the furnace feed.

As opposed to the well-known proposals for the production of iron by means of the revolving tube furnace process, in which as a rule the iron is produced as a sponge or as liquid pig iron, the essential feature of the Krupp-Renn process lies in the special function of the pellet-zone. This forms the essential difference between this process and related revolving-tube furnace processes, for example, the Walz process for the distillation of zinc and lead.

Both the Walz furnace and the Renn furnace consist of a gently sloping tube furnace in which a mixture of ore and solid reducing material are worked under a stream of gas passing in the opposite direction. In the case of the Walz furnace the contents usually lie along the furnace in a shallow layer, while at the exit end of the Renn furnace a high block ring is built in, by means of which the material in the last part of the furnace is brought up to a greater depth than the rest. In both processes oxidation will take place in the last zone of the furnace on the surface of the charge, while reduction is maintained on the

Fig. 1—Operational sequence of the Krupp-Renn process.



Krupp-Renn Process . . .

inside due to the fuel still present. In the Walz process the individual particles of the charge frequently come to the surface so that in general, oxidation takes place mainly in the latter end of the furnace. With the Renn process, however, the ratio of oxidation to reduction is displaced in favor of the reduction proceeding inside the charge, owing to the stop-ring on the furnace exit. In this manner it is insured that in the Renn process the metal which has been oxidized on the surface is reduced again before it leaves the furnace and a slag low in iron results.

In the Walz process, the air required for the whole reaction is sucked through the furnace by means of a ventilator fan, while in the case of the Renn process it is blown under pressure onto the charge. On account of this blast of oxygen-bearing gas on to the surface of the charge a very brisk oxidation of the sponge metal takes place which, together with the simultaneous combustion of C and CO, leads to a sudden increase of temperature in a short length of the furnace. An iron-oxide bearing slag is thus formed which is proportionately free-running and fluid and which separates from the unburned iron, which simultaneously welds up into slag-free metal granules. Material which has been oxidized on the surface eventually finds its way into the middle of the charge where the iron in the slag is reduced afresh. The constant repetition of oxidation on the surface and reduction at the center leads to the growth of large iron pellets in a low iron-bearing slag. Since as much iron is reduced in the pellet-zone as is oxidized, the air required for the complete reaction when the furnace is in production need only cover a single combustion of the solid fuel in the charge, which, with the help of the iron oxide in the slag, is converted to gas and burned.

Advantages Over the Blast-Furnace

The Krupp-Renn process definitely makes smaller demands as regards the composition of the slag than does the normal smelting process. Whereas the latter necessitates a slag of sufficient fluidity and low specific gravity to obtain a good separation from the liquid metal, the Renn process only requires a slag which is semisoft at 2192° to 2372°F. The analysis range of such a slag, pasty at these temperatures, is naturally governed by the slag equilibrium diagram, and will be essentially larger than the range of a slag suitable for normal smelting; consequently, in general, the Renn process requires substantially less flux than the corresponding smelting (blastfurnace) operation.

Also in regard to the supply of a suitable fuel the

FIG. 2—The Renn process may be applied to (1) direct production of steel from pig iron, the pellets being further processed in an open-hearth or electric furnace; (2) enrichment of poor quality ore, and (3) production of nonferrous metals.

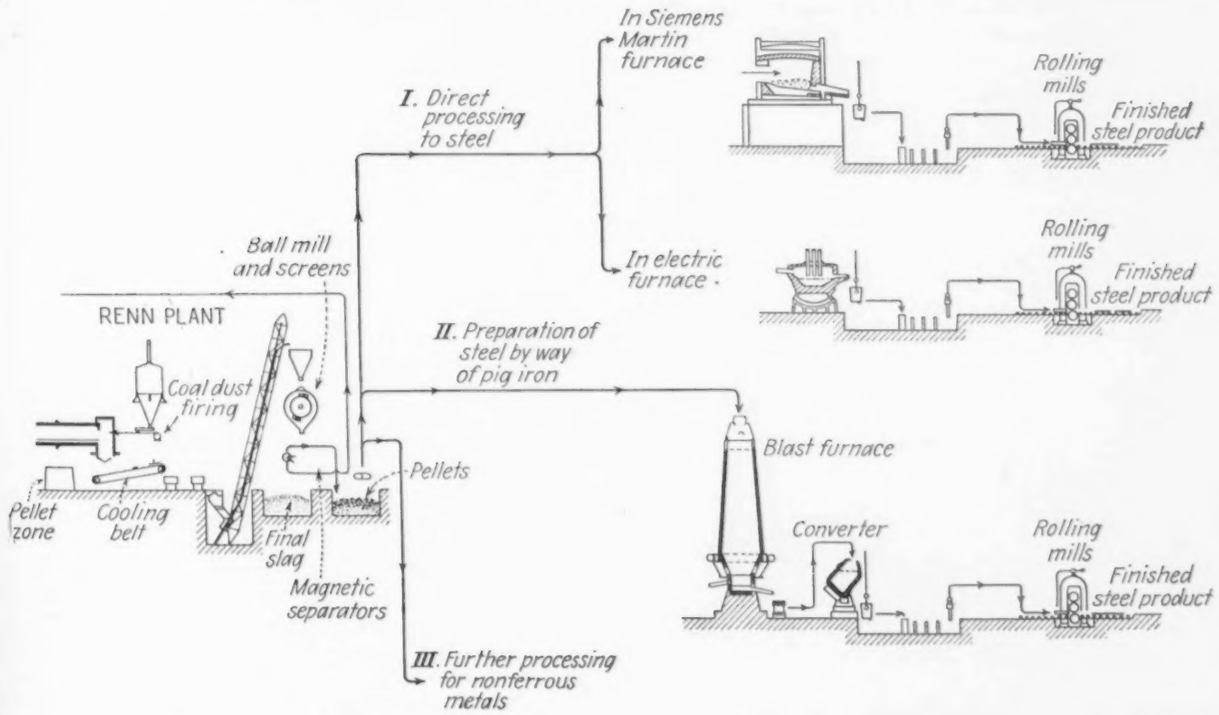


TABLE I

Treatment of Various Grade Ores by the Resin Process

Test number	1	2	3	4
Ore	Hematite	Magnetite concentrate	Magnetite concentrate	Hematite ore mixture
Dry analysis, pct:				
Fe	64.7	50.6	55.9	55.5
SiO_2	0.6	24.1	8.0	18.1
Al_2O_3	0.8	2.2	1.5	1.0
CaO	—	1.2	0.5	0.2
MgO	—	0.9	9.0	—
S	0.05	0.05	0.04	0.09
Moisture	2.0	0.4	1.5	1.5
Reducing agent	Charcoal	Low-temp. coke	Anthracite	Coke breeze
Dry analysis, pct:				
Fixed carbon	68.1	69.2	63.8	83.8
Volatiles	26.8	9.3	6.1	3.9
Ash	2.8	19.2	29.2	11.7
Sulfur	0.06	0.26	0.40	1.15
Moisture	18.7	5.7	5.7	16.4
Additions, pct:				
Sand	40.0	—	7.5	—
Burned lime	10.0	20.0	—	10.0
Return slag	5.0	—	10.0	25.2
Nodule analysis, pct:				
C	0.9	2.1	1.1	0.8
P	0.2	0.2	0.05	0.08
S	0.09	0.06	0.35	0.65
Nodule Recovery, pct	96.0	97.0	97.0	97.5

Renn process makes fewer demands than the blast furnace. The physical properties of the fuel, such as screen size and resistance under pressure, play no part as the fuel is finely ground and mixed with the ore. Fuel with a high ash content causes no difficulties and is preferable to low ash material if it can be obtained at a lower price. It is found in practice that nearly all of the commonly used finely ground fuels may be used as a means of reduction, including coke slack, anthracite, charcoal dust, coke from bituminous coal and lignite as well as those fuels in the raw state. In the case of highly bituminous coal it must be borne in mind that the volatiles will distill off in the warming-up zone and will only take part in the process insofar as solid carbon is formed during cracking. It is therefore recommended that bituminous coal be given low-temperature treatment insofar as the value of the constituents saved is greater than the cost of the carbonization.

TABLE II

Treatment of Limonite, Sparry Iron Ore and Limonite, Titaniferous Sand and Slime by the Resin Process

Test number	5	6	7	8
Ore	Limonite	Sparry iron ore and limonite	Titaniferous sand	Titaniferous slime
Dry analysis, pct:				
Fe	47.1	43.0	35.9	32.2
SiO_2	10.0	11.0	27.7	4.3
Al_2O_3	5.5	3.1	8.3	13.3
CaO	1.2	2.3	0.4	13.6
MgO	0.7	2.7	0.6	0.8
S	0.2	0.9	0.1	0.3
Moisture	11.5	Mn 5.1 8.3	TiO_2 5.8 20.7	TiO_2 5.7 56.4
Reducing agent	Coke breeze	Low-temp. coke	Low-temp. coke	Lignite
Dry analysis, pct:				
Fixed carbon	80.8	57.8	80.1	—
Volatiles	3.6	14.5	6.4	—
Ash	12.7	26.5	12.9	18.1
Sulfur	1.1	2.5	0.2	1.1
Moisture	14.3	18.0	5.7	64.3
Additions, pct:				
Sand	—	3.8	—	—
Burned lime	—	15.0	8.0	—
Return slag	20.0	—	—	—
Nodule analysis, pct:				
C	0.3	1.7	1.6	0.5
P	1.8	0.2	0.14	0.9
S	0.7	0.5	0.12	0.3
Nodule recovery, pct	97.0	94.0	96.0	92.5

The pellets obtained by the Krupp-Renn process are practically slag free and occur in size between 0.06 to 2 in. They form a low-carbon intermediate product which may be finally worked into finished metal or alloy.

Application of the Renn Process

There are three principal ways of classifying the Renn process as applied to present-day melting developments which are set out in fig. 2: (1) The direct production of steel from the product of the blast furnace, the pellets being further processed in an open-hearth or an electric furnace; (2) the enrichment of a poor quality ore, especially one with a high silica content, in a blast-furnace concentrate; the pellets, which are practically slag-free, may be smelted again in the blast furnace with proportionately less coke added; the further processing of the pig iron to steel follows in the usual ways; (3) the production of nonferrous metals, for example, nickel, cobalt, copper, silver, gold and platinum metals, in each case with iron as well; in these processes the iron content of the ore acts as a collector of the nonferrous metal in place of the usual smelting method for a sulfur or arsenic compound.

The direct production of steel without the use of the blast furnace is particularly suitable in cases where a supply of ore is available, but the supply of suitable coke for blast furnace smelting is not readily at hand. If in such a case a finely divided fuel can be obtained, the Krupp-Renn process is likely to be an improvement as an iron-making method. The total layout cost of erecting a Renn plant, including the necessary steelworks, will as a rule be considerably less than that of building a similar capacity blast furnace plant and its ancillaries and the accompanying steelworks. Thus the Renn process working with the better quality ores can utilize any available supplies of finely divided fuels.

The second application of the Renn process is in the production of blast furnace concentrate. This proposition is only practicable for districts where a blast furnace industry is already in operation but where low-grade iron ores, particularly those with a high silica content, have to be worked. In such cases the process can also be used by itself producing pellets from low-grade ores, not for the blast furnace but for steel production direct. The following results of trial smelting runs serve to show what the Renn process is capable of in the three different applications.

Table I shows the results of trials carried out with different grade ores, the composition of which is also well suited to blast furnace operation. For trials 1 and 4 a rich hematite ore was used, for 2 and 3 a magnetite concentrate, which can be prepared by simple magnetic separation of crude ore ground to 1 mm

size. As a reducer, charcoal dust, low-temperature coke as well as anthracite and coke slack were used. In accordance with the low sulfur content of the fuels in trials 1 and 2, the pellets, as the analysis shows, were very low in sulfur with 0.06 to 0.09 pct S, while in the case of trials 3 and 4 an increase in the sulfur of the fuel gives rise to pellets with rather higher sulfur content.

For a good mechanical intermingling of the charge in the pellet zone a minimum slag volume of 1325 to 1765 lb per ton of pellets must be maintained. Consequently with a very rich ore a larger proportion of material must be added to make up the slag; for example, in the first trial run 40 pct of sand and 10 pct of burned lime. The burned lime added in the experimental runs contained 75 pct of CaO and in production could be replaced by a corresponding quantity of raw limestone. Instead of forming the slag with a fresh addition of sand and lime this can also be done by passing back the final slag of the process. In this way only as much sand and lime need be added as is required to combine with gangue minerals in the ore. This is shown in trials 3 and 4 (table I). With the ore No. 3, 7.5 pct sand, and with ore No. 4, 10 pct lime, suffice to combine with the gangue, and so 10 and 25 pct respectively of the final slag is employed to make up the total slag volume. Passing back the final slag lowers the working temperature of the process usefully, as the softening point of a ready-made slag is lower than the combining temperature of the same slag made by the mixing of the individual components. Passing back the final slag in working a rich ore has the further advantage that only the gangue-bearing portion of the slag is put aside, consequently the yield of iron, as is shown in trial 4 with 97.5 pct lies particularly high.

Renn Process as a Direct Steel Producer

Table II shows under 5 and 6 the processing of limonite and roast spar, and under 7 and 8 that of titaniferous materials. The slag volume of the limonite in No. 5 only ran something in the way of 880 lb per ton of pellets. As the gangue minerals, without any addition, gave a slag well suited to the process, operations were carried out only with returned final slag. With the mixture of roast spar and limonite, No. 6, a small quantity of sand and lime was added at the same time. As the fuels used in Nos. 5 and 6 contained larger amounts of sulfur, so the sulfur content of the pellets was also about 0.5 to 0.7 pct.

With the relatively low temperatures employed in the Renn process, titanium oxide is not reduced and remains in the slag, the properties of which, through the addition of titanium, are made advantageously liquid. Therefore the Renn process makes it possible to use titaniferous material which hitherto could only be smelted in the blast furnace after considerable dilution with other ores. The titaniferous irons and No. 7, was worked with an addition of 8 pct of lime with low-sulfur coke to form pellets with 0.12 pct S, whereby a very smooth furnace campaign and a high yield were obtained. Trial No. 8 was carried out on a titaniferous red mud from the bauxite workings which contained over 50 pct water. Added to raw lignite, with a moisture content of 60 pct it was directly processed in the Renn furnace to form relatively low-sulfur pellets.

For the direct melting of pellets to make steel, the electric furnace or the Siemens-Martin furnace comes into question. Low-sulfur pellets, as produced in one of these trials, may be melted without further delay as a scrap charge in these furnaces. This has the advantage that the usual contamination of scrap with alloy metals does not happen with the pellets, and one works with a charge of uniform properties.

Pellets rich in sulfur and phosphorus can be successfully melted in the electric furnace and the openhearth furnace as a complete charge, as shown by the examples in table III.

Table III shows trial melts in an electric arc furnace with a capacity of 5 to 15 tons. In trials 1 and 2 the charge consisted of pellets and scrap, while with trials 3 and 4 only pellets were used. As the analysis of the charges show, the pellets in trials 1 and 2 were high in phosphorus, while in trials 3 and 4 the phosphorus content was less, but the sulfur content high, from 0.75 to 0.81 pct. However, as the duration of the melting and the analysis of the final melt show, the reduction of the sulfur and phosphorus in the pellets in the electric furnace presents no particular difficulties.

TABLE III

Treatment of High-Sulfur and High-Phosphorus Pellets in the Electric Arc Furnace

Test number	1	2	3	4
Weight of charge in tons	12	5.2	12.5	14.1
Charge, pct of total weight:				
Nodules	45	80	100	100
Scrap	55	20	—	—
Charge analysis (calculated), pct:				
C	0.66	1.20	0.65	1.50
Mn	0.30	0.10	0.32	0.48
Si	0.10	0.04	0.09	0.10
P	0.51	0.76	0.10	0.21
S	0.31	0.29	0.81	0.75
Analysis of steel, pct:				
C	0.38	0.12	0.18	0.98
Mn	0.71	0.53	0.35	0.29
Si	0.18	0.28	0.38	—
P	0.021	0.019	0.011	0.026
S	0.015	0.019	0.026	0.027
Time for melt	6 hr 45 min	7 hr 50 min	6 hr 30 min	6 hr 20 min

TABLE IV

Melting of Resin Pellets in the Openhearth

Test number	1	2	3	4
O.H. furnace	Fixed	Fixed	Fixed	Tilting
Wt. of charge, tons	15	20	20	85.2
Charge pct of total weight:				
Nodules	50	75	75	33.0
Scrap	50	10	10	24.6
Cast iron scrap	—	15	15	—
Pig iron	—	—	—	42.4*
Charge analysis (calculated), pct:				
C	2.00	2.70	2.80	1.80
Mn	1.60	1.50	1.50	1.60
Si	0.67	0.50	0.50	0.57
P	0.67	0.64	0.64	0.19
S	0.40	0.32	0.32	0.11
Analysis of steel, pct:				
C	0.18	0.34	0.28	0.80
Mn	0.60	0.87	0.50	0.56
Si	0.26	0.34	0.37	0.18
P	0.053	0.035	0.016	0.015
S	0.055	0.057	0.036	0.036
Time of melt	6 hr 35 min	6 hr 40 min	7 hr 40 min	6 hr 45 min

* Liquid.

The melting of Renn-pellets in the openhearth furnace is set out in table IV.

In trials 1 to 3 this was carried out in a fixed furnace with a capacity of 15 to 20 tons, trial No. 4 was performed in a tilting furnace of 85 ton capacity. Trials 1 to 3 were carried out at the Baildon Smelting Works in Kattowitz, and show the working of a high sulfur and phosphorus charge. In trial 1 the charge consists of 50 pct pellets and 50 pct scrap as against 75 pct pellets, 10 pct scrap and 15 pct broken castings in trials 2 and 3. Trial 4 shows the process carried out with the addition of molten pig iron, and thus the pellets only act as part of the scrap. Owing to the considerable dilution of the sulfur and phosphorus content the process set out in trial 4 does not differ to any extent from the normal charges.

Table V shows the actual melting progress of a single heat which is set out in table IV under trial 2, as a trial melt in the openhearth furnace. The charge consisted of 15 tons of pellets, 2 tons of scrap and 3 tons of broken castings, and affords an example of the working of the steel process from pellets alone, without the addition of pig iron from an outside source. As is shown in the table, the heat was run with a total of four slags. The curves of the melting diagram show how during the refining period in which the phosphorus content goes down from 0.45 to 0.04 pct, the sulfur simultaneously from 0.27 to 0.071 pct, so that with the last refining slag only a relatively small quantity of sulfur has to be removed. It is a matter of course that for a single trial on an openhearth furnace results as regards final analysis and melting time will be greatly improved when put into continuous operation. However, the foregoing results serve to show that a direct processing of pellets in the openhearth is possible even if high sulfur and phosphorus contents are to be dealt with, and that bought scrap and pig iron are not necessary to do this satisfactorily.

For the working of low-grade iron ores, as well as the Renn process, there comes into question the acid smelting in the blast furnace and the enrichment of such ores by means of an initial treatment, for instance, initial magnetic roasting. Which of these processes will be the best for any individual case depends on the composition of the ore and on different considerations of economy. For acid smelting processes a slag with a base degree of 0.6 to 0.8 can be used, while for the Krupp-Renn process, operation is possible with a slag of base degree about 0.10, without additions. The Renn process is, therefore, in general the most suitable means of working ores, the composition of which is such that they could only be smelted with a considerable addition of lime. In addition it will save both in plant and operational costs and demand the least in the way of fuel. The Renn process possesses the advantage over other pretreatments of a considerably higher yield of iron; for ores with 25 to 30 pct Fe, the yield is from 92 to 94 pct and for ores with 20 pct Fe it is even about 90 pct. All pretreatment processes have this in common, namely, that they seek the highest degree of separation of the individual ore particles from the gangue minerals, and that even in the most favorable cases the iron content of the gangue, which, for example, in many German ores is some 9 to 15 pct, must be counted as a final loss. The yield of these pretreatment processes is therefore usually only about 70 to 80 pct.

Renn Trials on Low-Grade Iron Ores

Table VI shows the results of Renn trials on different sorts of low-grade iron ore. With ore No. 10, which has a high MgO content, a sand addition has been made; ore No. 12, which contains 58.8 pct SiO, has been given an addition of lime, while Nos. 9 and 11 have been worked without additions. As reduction material a low-temperature coke with a sulfur content of 0.7 pct has been used in trial 9, and for

TABLE V

Report of Siemens Martin Charge No. 2 of Table IV

Charge	Net Tons
Cast iron	3
Scrap	2
Pellets	15

Charge	Lb.
FeMn (80 pct)	728
Coke	330
Broken electrodes	882

Progress of Melt	Additions (in Lb)									Analysis, Pct			
	CaO	CaF_2	Sand	Ore	Coke	Broken Electrodes	FeMn	FeSi	Al	C	Mn	S	P
13.40 Start of charging	882	....	....	....	330	882	728	....	....	....	....	....	....
14.45 End of charging	....	....	....	....	....	....	....	....	....	....	....	....	....
17.50 Charge melted out	....	....	....	....	....	....	....	....	....	....	....	....	....
17.50 Slag drawn	....	....	....	....	....	....	....	....	....	....	....	....	....
17.55 Test 1	661	....	....	....	....	....	....	....	....	0.88	0.41	0.54	0.27
18.25 Test 2	1102	....	....	529	....	....	....	....	....	0.81	0.51	0.48	0.22
18.40	551	....	....	....	....	....	....	....	....	....	....	....	....
19.00 Test 3	....	....	....	....	....	....	....	....	....	0.58	0.40	0.20	0.17
19.10 Slag drawn	....	....	....	....	....	....	....	....	....	....	....	....	....
19.10 Test 4	....	....	....	....	....	....	....	....	....	0.49	0.50	0.12	0.14
19.20	772	176	....	220	....	....	....	....	....	....	....	....	....
19.25	....	....	....	....	....	....	132	....	....	....	....	....	....
19.30 Test 5	....	....	....	....	....	....	....	....	....	0.42	0.57	0.051	0.098
19.35 Slag drawn	....	....	....	....	....	....	....	....	....	....	....	....	....
19.45 Test 6	1102	110	....	....	....	....	....	....	....	0.35	0.43	0.039	0.071
19.55 Test 7	....	....	....	....	....	....	....	....	....	0.29	0.36	0.031	0.061
20.00	....	....	....	....	....	....	353	....	....	....	....	....	....
20.10 Test 8	....	....	....	....	....	....	....	....	....	0.37	1.07	0.034	0.059
20.20 Tapped	....	....	....	....	....	....	....	209	6.6	....	....	....	....

Analysis of pellets: 1.0 pct C; 0 pct Mn; 0.50 pct Si; 0.80 pct P; 0.40 pct S.
Analysis of charge (calculated): 2.7 pct C; 1.52 pct Mn; 0.5 pct Si; 0.64 pct P; 0.32 pct S.
Analysis of finished steel: 0.34 pct C; 0.87 pct Mn; 0.34 pct Si; 0.035 pct P; 0.057 pct S.
Duration of heat: 6 hr 40 min.

TABLE VI

Various Low-Grade Ores Treated by the Renn Process

Test number	9	10	11	12
Ore	Limonite (ore mixture)	Hematite	Clay iron-stone	Limonite (ore mixture)
Dry analysis, pct:				
Fe	38.5	30.9	29.2	18.2
SiO_2	13.4	21.5	16.12	58.8
Al_2O_3	5.4	5.9	11.2	2.3
CaO	4.0	1.3	1.4	0.6
MgO	0.9	17.3	1.6	1.1
S	0.2	0.04	0.3	0.2
Moisture	8.0	0.5	4.3	1.4
Reducing agent	Low-temp. coke	Coke breeze	Coke breeze	Coke breeze
Dry analysis, pct:				
Fixed carbon	65.8	84.7	85.0	85.5
Volatiles	14.6	2.3	2.1	2.6
Ash	16.8	11.6	10.8	10.5
Sulfur	0.7	1.1	1.1	1.1
Moisture	26.0	14.3	17.0	10.8
Additions, pct:				
Sand	—	10.0	—	—
Burned lime	—	—	—	10.0
Return slag	—	—	—	—
Nodule analysis, pct:				
C	1.4	0.8	1.1	1.6
P	0.5	0.15	0.18	0.45
S	0.4	0.50	0.75	0.85
Nodule recovery, pct:	96.0	92.0	93.0	91.0

trials 10 to 12, small coke with 1.1 pct S; therefore in all cases sulfur-rich pellets with 0.4 to 0.85 pct S have been produced. The yields of iron for these trials are between 92 and 96 pct and even in the case of No. 12, where the iron content of the ore mixture is only 18.2 pct, the yield is 91 pct.

Renn Process for Nonferrous Metals

A third application of the Renn process consists of nonferrous metal production for metals such as nickel, cobalt, copper and noble metals. As examples of the method of working these, the reductions of Garnierite and a roast concentrate containing copper and zinc are set out in table VII. The Garnierites in Nos. 1 and 2 were low-percentage nickel ores containing respectively 0.93 and 2.47 pct Ni. Along with a relatively low iron content of 10.5 pct and 18.5 pct respectively, the ores contained large amounts of SiO_2 and MgO. While the ratio MgO; SiO_2 in the case of ore No. 1 was 0.29:1, that of No. 2 was 0.64:1. Both ores, when smelted in the shaft furnace, required a considerable addition in order to obtain a slag sufficiently fluid to separate properly from the nickel metal. In the Renn process it is only necessary to make an addition of about 5 pct of lime for both ores. The nickel combines with the iron to form an alloy containing about 9 pct Ni when the ores are smelted. With a different nickel to iron ratio in the ore, nickel-rich pellets with some 15 to 20 pct Ni may be prepared.

TABLE VII

Application of Renn Process to Smelting Nonferrous Metals

Test number	1	2	3
Ore	Garnierite	Garnierite	
Dry analysis, pct	Ni : 0.93 Fe : 10.5 SiO_2 : 55.0 Al_2O_3 : 2.9 CaO : 1.8 MgO : 15.8	Ni : 2.07 Fe : 18.5 SiO_2 : 33.05 Al_2O_3 : 1.3 CaO : 0.2 MgO : 21.0	Cu : 7.8 Zn : 37.5 Pb : 1.0 Fe : 24.1 S : 5.5 g/t Ag : 453.0 g/t Au : 3.7
Loss on ignition, pct	19.4	34.2	—
Reducing agent	Coke breeze	Coke breeze	Coke breeze
Product	Pellets with 8.8 pct Ni	Pellets with 9.2 pct Ni	(1) Zinc oxide with 74.7 pct Zn and 2.6 pct Pb. (2) Pellet concentrate with high sulfur content.
Metal yield	About 83 pct Ni in the pellets	About 92 pct Ni in the pellets	About 95.97 pct Zn and Pb in the oxide. About 96 pct Cu; 97 pct Ag; 99 pct Au in the pellet concentrate.

The working method of the Renn process for smelting Garnierite differs only slightly from that used for iron ores. The setup must naturally be adapted to the low total metal content of the ore and the high MgO content of the slag. The yield of nickel in the pellets for the 2 pct ore ran 92 pct, and for the 0.9 pct ore about 83 pct. The iron pellets containing nickel produced in this process were not worked further to produce pure nickel, but after the necessary refining were used in the production of nickel alloy steel.

Combining the Renn and Walz Processes

Trial No. 3 illustrates a combination of the Renn process and the Walz process. From a roast concentrate containing copper and zinc, the zinc and lead were collected by volatilization in the form of rich oxides, and simultaneously the copper, silver and gold were recovered in a pellet concentrate. In this case also the operation is not greatly different from that for an iron ore as the zinc and lead distill off very fully under the conditions in the pellet zone and take no further part in the reaction. The further working of the pellet concentrate, which occurs in small granular form owing to the high-sulfur concentrate of the roast ore, presents no undue difficulty. The usual methods may be employed, for example, sintering and smelting in a shaft furnace.

Of greater importance, the combination of the Renn and Walz processes could be employed for the processing of zinc-bearing iron ores and smelting products, for example, zinc-bearing furnace dust. The combination of the two processes offers a means of obtaining zinc oxide and iron pellets in a single operation and would therefore be a particularly economic way of working such material.

▼ ▼ ▼

Producing 70 Tons Of Die Castings Daily

. . . Equipment and procedures used in achieving the unusually high production of 70 tons daily in the world's largest single plant for die casting is described in the article. The extensive mechanization of the casting handling system is discussed in particular detail.

o o o

By HERBERT CHASE

o o o

DAILY production of 70 tons of die castings, believed to represent a record for a plant devoted exclusively to die casting, is the achievement of the Die Casting Div., Electric Auto-Lite Co., Woodstock, Ill. This production is made possible by a high degree of mechanization, modern equipment and a general layout designed to the single end of production with quality. Although the equipment at this plant was designed and laid out to accommodate its particular die casting activities, the underlying production philosophy is such as to make it readily applicable to any large die casting unit.

Although the casting installations themselves are large, they require much less space than is given to machining, polishing, plating and other finishing. The plant actually is a job shop that serves many industries and is arranged flexibly so as to handle constantly changing production. Yet, by far the largest output is for the automotive industry. The bulk of this output is in zinc alloy castings, most of which require plating, but there is also a large section devoted to aluminum die casting much of which is done on cold chamber machines.

As the greater proportion of the die castings are needed in large quantities, it is feasible to use highly efficient setups in machining, polishing and other operations besides casting. Yet, except for special dies and fixtures, most of the equipment is quickly adapted to process a large variety of parts. Conveyors not only expedite the handling of castings in process but also deliver molten metal to casting machines and return sprues, runners, flash and scrap parts to furnaces for remelting.

Because of the variety of parts cast and finished, and certain specialized operations needed, as well as because the plant has been expanded several times without complete rearrangement of equipment, flow is not always toward the shipping floor. There is, however, a general flow from casting to machining to polishing and buffing and then through finishing operations with as little manual handling as these conditions and the constantly changing production schedules permit.

Where quantities warrant, special machining lines are set up next to the casting machines. But, especially for short-run work, parts are trucked in tote boxes to a general machining department where a variety of operations are performed as efficiently as the ever-changing supply of castings permits.

There are two main casting departments. The first includes buildings 9, 16 and 24 (fig. 1) containing machines for both zinc and aluminum casting. Although reference is made here to several buildings, they are actually contiguous units, separated only by fire walls so that all the buildings constitute one plant that is merely separated into rooms that open into adjacent rooms or departments.

Most of the zinc casting machines used in building 9 produce large castings, such as automobile grilles, shown in fig. 2, or employ other large dies, fig. 3, some of which have multiple cavities. Many of the larger zinc castings are trimmed of flash, runners and gates in presses close to the respective casting machines and then are hung on chain conveyor indicated as A, fig. 1, that carries them through machining and polishing in buildings 1, 3 and 32. Other castings are trucked to building 23 for trimming and machining.

Zinc casting machines in building 9 are supplied with molten alloy from furnaces at the south end of this building, ladles being handled by electric hoists on overhead monorails. Aluminum machines are supplied similarly with alloys from furnaces in building 16.

The base metals and alloying elements are weighed out at the furnaces and are charged, with suitable proportions of scrap, including only rejected castings and sprues, gates and flash from castings made in the plant, to yield the standard alloys required. Analyses are constantly checked in a well-equipped laboratory that includes a spectrograph and other necessary facilities to insure rigid adherence to the compositions specified.

The second casting department handles only zinc alloy prepared in the smelting room at the north end of building 31 and is transferred by ladles on monorail hoists to casting machines along the west and south sides of building 33 which comprises about half the plant. In effect, building 33 is a self-contained unit, producing, machining, polishing, plating,

painting, assembling and packing castings with the general overall flow from south to north. Some castings, however, are trucked in from other buildings, especially for plating, and some are received on conveyors after polishing and others after packing in buildings 30 and 32.

Of special interest is the arrangement for production and machining of zinc die castings in building 33, where there is an unusually long row of casting machines along the west wall and a shorter row of machines made in the plant along the south wall. All these machines are served by three melting furnaces in the smelting room that adjoins the west wall.

Subsequent articles by Mr. Chase will cover in detail procedures used in this plant for preparing castings for plating, including buffing, Roto tumbling with limestone chips and cleaning in alkaline solution, and also the production line technique employed for applying bright copper-nickel-chromium finishes.

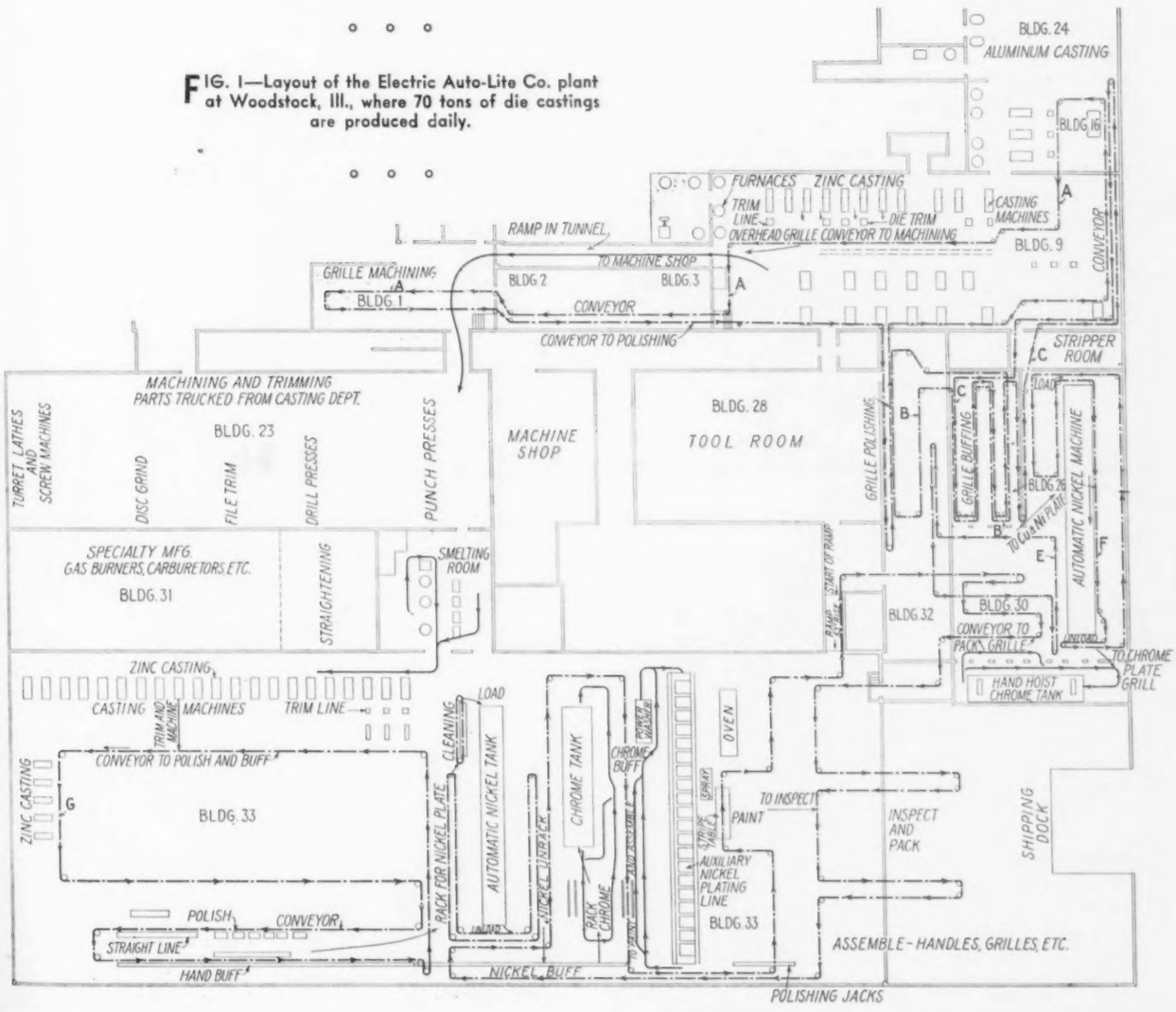
A monorail for a trolley ladle parallels the rows of casting machines. These have their metal pots toward the walls but far enough away to provide a wide aisle next to the wall for moving and pouring from the ladle after it is filled at the furnaces. This arrangement is such that the aisle is reserved almost exclusively for metal handling, making for greater safety.

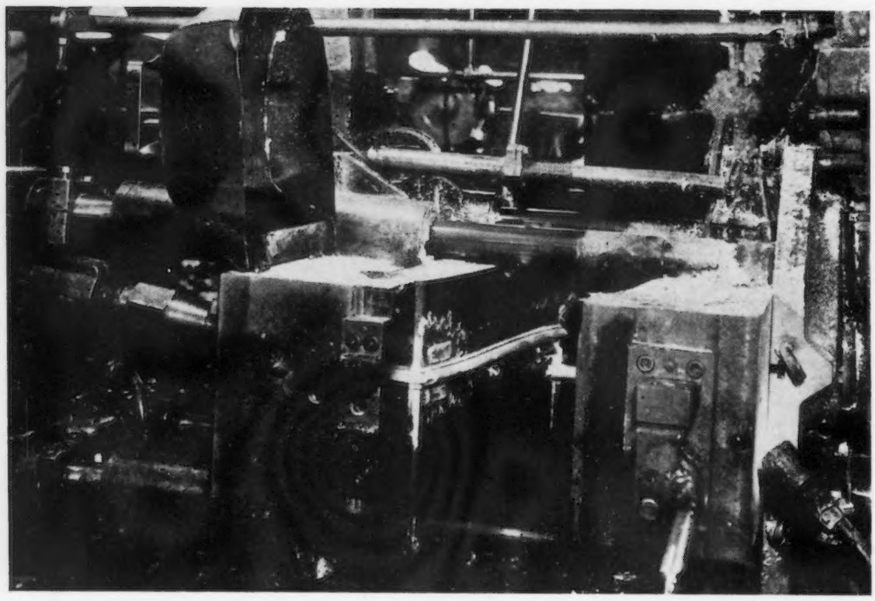
By supplying casting machines with molten metal, the alloy in the metal pot at the machine is not only kept at a more nearly uniform temperature but makes it necessary to supply the respective metal pots with only enough heat to make up for radiation losses.

At the side of each casting machine there is a metal-top bench and, at the end of each bench, a metal chute. There is also a water tank at each bench in which, as a rule, the machine operator quenches the gate of castings after lifting it from the machine. Then the operator places the gate on the bench and pushes it along into the chute after a quick inspection to see that castings are satisfactory. Any rejects usually are broken off or if, as in starting a cold die, castings do not fill out, the whole gate may be placed on a belt conveyor, fig. 4, that carries it, along with rejects and scrap, back to the melting furnaces.

This belt parallels the rows of machines and separates them from the machining area where nearly all personnel in this general area, except casting machine operators, work. After passing under all the chutes this belt spills its load onto another belt placed at right angles to the casting machine line.

FIG. 1—Layout of the Electric Auto-Lite Co. plant at Woodstock, Ill., where 70 tons of die castings are produced daily.





LEFT

FIG. 3—Closeup of die for producing grille molding about 60 in. long. Because of extreme length of piece, the die overhangs the platen and requires a supplementary locking device at each end.

o o o

BELOW

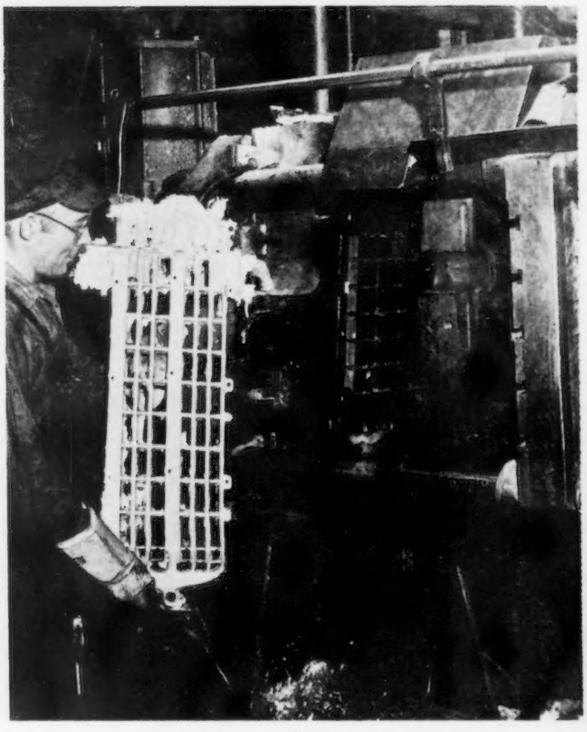
FIG. 2—One of the largest casting dies in the plant and the grille produced in the die. Die in background is in the open position.

The second belt runs up an incline and its load is diverted into elevated hoppers next to the melting furnaces. From time to time, the hoppers are discharged into the furnace pots along with new metal for melting.

Chutes that bridge the main scrap belt serve to carry a limited bank of castings and deliver these either to a trim press or to temporary storage boxes, or both. These boxes add to the bank awaiting machining. In general, punch presses equipped with trim dies are placed next to the scrap belt so that the operator can reach new gates of castings and, after trimming, drop the sprues, runners and flash into short chutes down which the scrap slides onto the belt. Any defective castings spotted by inspectors also go onto the scrap belt and thereafter, unless a casting happens to be damaged in processing, or fails to pass later inspection, the only scrap created is in chips removed in subsequent machining.

As far as possible, arrangements are such that castings which require machine operations are passed through the necessary machines as rapidly as they are produced and trimmed. Moreover, to avoid extra handling, the machines are grouped as near to the trim press as conditions permit. In the usual setup, the castings are passed from machine to machine until all required cuts have been taken and then are loaded on an overhead chain conveyor that carries the castings to polishing, tumbling or such other operations as are needed to prepare the castings for plating or other applied finish.

Castings may even reach the chain conveyor while still warm from casting but it is often necessary to provide sizable banks to compensate for occasional unavoidable delays in any one of the chain of operations required. The plan, however, is to place a given die in a given casting machine and, by the time the die starts to turn out acceptable castings, have all supplementary machines, trim dies and fixtures or other tools needed ready to process the castings as produced. This involves close coordination and often means at least small banks at certain points, since it is difficult to keep all operations, each of which may involve a different time element, in desired synchronization.



Clearly, this plan often necessitates the rearrangement of machines but, by proper planning, castings that need similar or identical operations can be routed through machines already grouped to handle them.

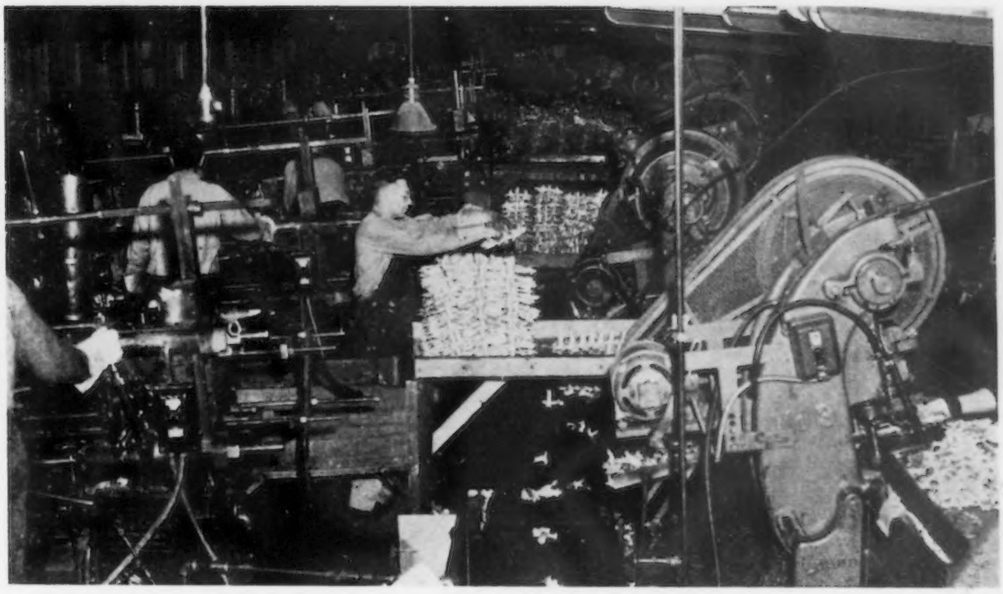
Since castings are produced close to size, only light machining cuts are needed. The light machines required, such as drill presses, tappers, belt sanders and the like, are very easily shifted into new positions when necessary, especially as all have their own individual motor drives.

Although efforts are made to avoid hand filing and scraping, some of this is required, especially on edges where surfaces are irregular or awkward to bring into machining positions. The objective, however, is

o o o

FIG. 4—View of a line of casting machines (left) and a row of trimming presses (right). Belt in center carries scrap back to furnaces.

o o o



to have castings reach conveyor marked G, fig. 1, ready for advancing to polishing and subsequent finishing operations. As setups for the latter also require some rearrangement and cannot always keep perfect step with production, banks of castings do have to be stored temporarily and either cannot go at once onto the chain for advance through finishing operations or must be removed from the chain at some point along its circuit. It follows that considerable areas within the large loop made by conveyor chain "G" are used for temporary storage of castings, as well as for storing certain tools and supplies and for inspection operations.

Since building 33 houses a large installation for finishing operations, the castings made in it are chiefly those that are to be plated. Most of these castings are of small to medium size and a large proportion are classed as automobile hardware and trim. These require a high grade of finish and finishes that must meet exacting specifications.

Although similar specifications must be met on many larger castings, especially radiator grilles and large trim panels, these larger parts involve some different problems, both in production and finishing. Larger casting machines, to accommodate larger dies are needed and the castings necessitate using large trim dies, figs. 5 and 6, that, in turn, have to be used in large presses. Handling problems are also different. In consequence, all large zinc alloy castings, along with some of medium size, are cast in building 9 and are processed there and in adjacent buildings served by chain conveyors and also by trucks handling parts in tote boxes. A substantial part of these

FIG. 5—Bliss press equipped with a large trimming die for removing flash from a grille casting.

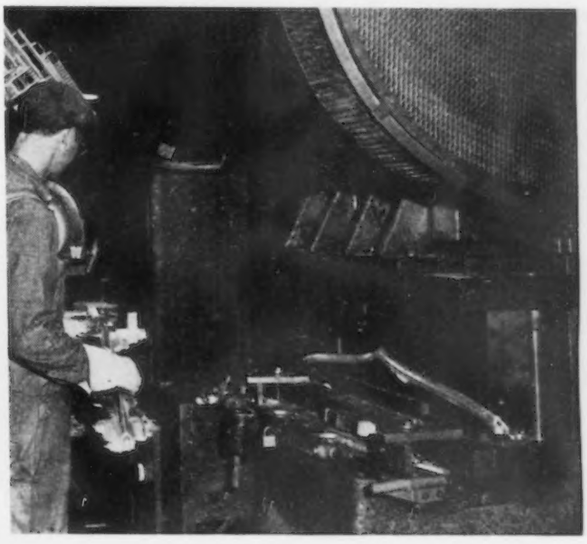


Fig. 6—Trimming the grille molding shown in fig. 4.

castings go through a plating setup that is separate from, though similar to, and operated in substantially the same way as the plating setup in building 33.

There is also a similarity in the machining procedure. This is done, as far as possible, as close to the casting machines as conditions permit but the large trim presses and other large machines are not very easily shifted. In other words, it is sometimes easier to transfer castings to machines than to shift the large machines to handle the output from specific dies or casting machines.

Grilles and other large castings also require somewhat specialized polishing and buffing equipment that is placed where it serves its particular needs rather than being located with corresponding equipment for smaller castings. For these reasons, after trimming,

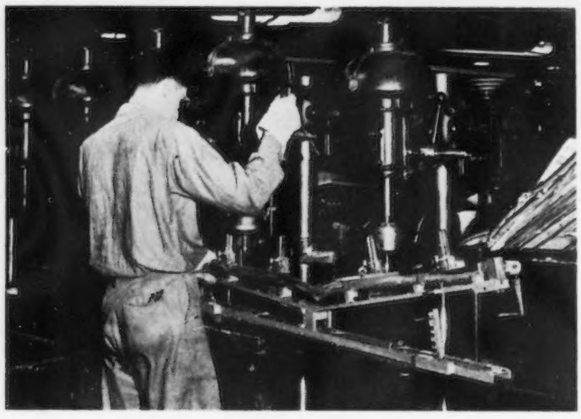


FIG. 7—Drilling and tapping V-shaped grille parts. In castings where the axes of the holes are not parallel, a rocking fixture is used, which is slid along the press and the parts tilted to obtain the proper drilling angle.

grilles go onto conveyor A, fig. 1, which takes them to building 1, where machining, chiefly drilling and tapping, and hand filing are done. Considerable filing is needed, partly because trim dies do not remove all flash, especially in slots between bars, where it is not commonly reached in polishing.

Grilles go next, again on conveyor A, to polishing. This is really a grinding operation that removes parting lines and such surface irregularities as may occur.

Many castings of medium size produced in building 9 are trucked to the general machine shop in building 23. There the machines are segregated into

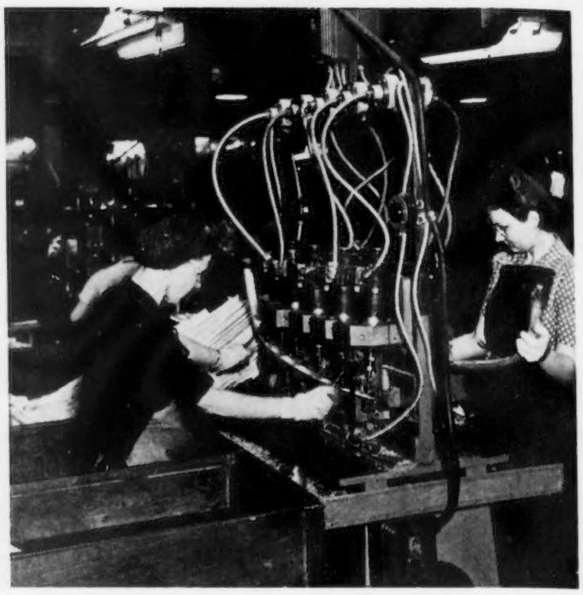


FIG. 8—Multiple drilling operation. Drills are set at various angles to accommodate odd-shaped parts. Left moldings are handled on one side of the machine and right moldings on the reverse side.

groups including punch presses, used chiefly with trim dies; drill presses for drilling and tapping; figs. 7 and 8, file trim, mostly hand work, disk grinding, and screw-machines. This department handles both zinc and aluminum die castings but only the zinc type, and not all of these, go to subsequent plating. Handling in the machine shop is mostly from tote box to machine, and back to tote box, but castings that require several operations are often passed through several adjacent machines before they are ready for transfer to other operations.

Besides the general machine shop in building 23, one in the next room handles maintenance machining. The tool room in building 28 makes and maintains dies and does similar work in producing and maintaining the fixtures and tools needed for machining die casting. Occasionally, special machines, chiefly for long-run multiple-spindle drilling or tapping, are built there, so as to complete several machine operations on a given casting while it is held in the fixture that is a part of a machine. This is done, however, only when the saving in time (and possibly greater precision or uniformity, as in hole location, for example) offsets whatever extra tooling cost may be involved.

Hot-Blast Cupola Practice in Germany

VERY favorable results with the use of hot-blast cupolas, using a blast temperature of 840 to 1110°F is reported by E. Piwowarsky in Giesserei, 1943, vol. 30, pp. 221-225. The hot-blast installation at Giessereiinstitut at Aachen indicated that particularly good results were obtained with blast temperatures in the range of 840 to 1110°F and that even with temperatures of 570°F and 1110°F, coke consumption was reduced respectively 18.4 pct and 36.3 pct and casting characteristics were improved. The article gives installation and operating details on the unit and also includes a discussion of heat balances.

The findings of Piwowarsky covered in the abovementioned report have been applied in a Schaffhausen foundry and resulted in reduction in coke consumption, lower sulfur, better tensile strength and higher elastic limit with the same elongation. A report on this installation is given in Giesserei, 1943, vol. 30, pp. 241-246. Four cupolas in this plant, having diameters of approximately 27.5 in. to 35.5 in. have been blown with air heated in Schack recuperators up to 1110°F. Included in this article is detailed data on coke consumption at varying blast temperatures.

New Equipment . . .

Stamping and Forming Presses

. . . Hydraulic presses, bending machines, shears, punches, die cushions and press accessories are described herein. Diecasting machines and plastic molding machines are also included in this review.

Hydraulic Press

HY-MAC hydraulic press featuring continuous dial feed and automatic ejection of part has

been announced by *Hydraulic Machinery, Inc.*, 12825 Ford Rd., Dearborn, Mich. This machine can operate on a single cycle or be set at repeat-cycle for continuous operation. The press is powered by a Hy-Mac hydraulic power unit housed in the base. The five-step cycle of the machine is accomplished by hydraulic sequence valves, solenoid operated four-way valves, pressure switch, limit switch, and a special electrical control panel. The push button panel, pressure gage and work ram are housed in the crown of the machine. The base of the machine houses the dial feed index mechanism, the locating cylinder which locates and locks the dial feed index and the ejector ram.

Broaching and Assembly Press

INCREASED flexibility of use has been provided on its "Junior" hydraulic broaching and assembly presses according to an announcement by *Colonial Broach Co.*, Box 37, Harper Station, Detroit 13, through additional equipment enabling the press to be used interchangeably, also for straightening operations. The changeover from assembly or broaching jobs to straightening work is accomplished

simply by placing, on the platen of the machine, a self-contained, single-unit roller type straightening fixture. The machines will be found most useful for straightening work on small diameter parts. While means are provided for solidly bolting the fixture to the platen of this machine, such attachment is usually not necessary since the fixture design provides balanced operating load on the vertical centerline of the machine and fixture. The fixtures are available for all sizes, ranging from one to four tons capacity. Machine operation is hydraulic, with infinitely variable ram speed and pressure controls available if desired.

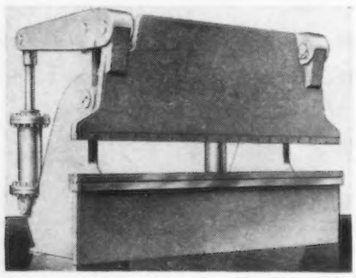
Bending and Forming Press

A HYDRAULIC press for bending and forming steel parts has been announced by the *Lake Erie Engineering Corp.*, 500 Woodward Ave., Buffalo. The machine is a 200-ton C frame type with a 42-in. right to left and 24-in. front to back die space. It has a 30-in. daylight opening and 16-in. stroke. The closing speed of this hand-operated press is 350 in. per min with a return speed of 345 in. per min. Welded steel housing, with extra heavy construction, is said to give minimum deflection under load. The upper, or moving platen, is rigidly guided for added

strength and accuracy. This press is said to speed up production, reduce costs, or improve product quality.

Bending Press

KNOWN as the Pacific model 325, a new hydraulic press for bending, braking, shearing, multiple punching and similar operations has been announced by *Pacific Industrial Mfg. Co.*, Oakland, Calif. The press has a working pressure of 325 tons and maximum pressure of 395 tons. It is equipped with electrical controls which balance pressures on the two hydraulic pistons so accurately, it is claimed, that the 12-ft ram will operate parallel with the bed, or maintain the desired preset tilt within ±0.005 in. whether the work is done at either end or in the center of the ram. Features of the press are its ability to deliver maximum pressure at any point in the stroke and for the duration of the stroke; micrometer stroke adjustment, excellent work clearance overhead in front and in back of the ram; and a minimum of working parts to reduce maintenance and repair expense. Full-circle bends from 4 ft in diam up may be made on plates up to 8 ft 6 in. wide; 18-in. horns are provided at either end of the ram.

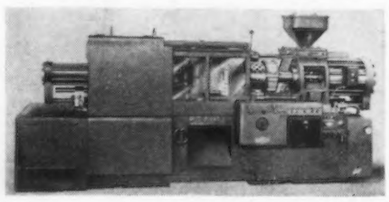


Metal-Cutting Shears

POWER-DRIVEN, metal-cutting shears, known as Cleveland Steelweld shears, and said to be new and different in many respects from other shears on the market, have been announced by the *Heavy Machinery Div.* of the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio. The machines are claimed to employ a revolutionary pivoted blade principle. There are no slides or guides to wear out of true and cause inaccuracies. The upper blade operates on two heavy pivot pins secured to the end housing and travels in a circular path. The knife clearance may be varied to suit the thickness of plate being cut and turning a hand crank changes the gap between the knives. A large dial indicator shows both the clearance in thousandths of an inch, and the plate thickness that may be cut for any knife setting. Steelweld shears may be arranged for squaring, slitting, or set at any intermediate position for notching, and firmly locked on machines with standard 24-in. deep throats. The beds on these shears are welded integral with the frames. The large crown is welded to both end housings. The machines have been developed in sizes for cutting plate of all thicknesses from 12 gage to 1¼ in. and for lengths from 6 to 16 ft. Speeds range from 60 strokes per min on the smaller shears to 25 strokes per min on the largest size.

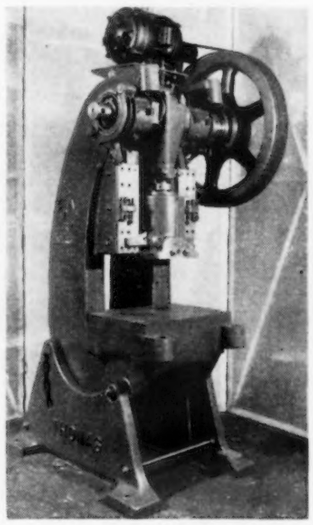
Plastic Molding Machine

IMPROVED plastic injection molding machines, 10D, 6 and 8 oz., announced by *Reed Prentice Corp.*, Worcester, Mass., feature double shear link mechanism which is claimed to increase rigidity and reduce maintenance, one-piece welded steel base, hydraulic piping and valves mounted outside base for accessibility, guards which are easily removed for maintenance, electric timing clocks, quick adjustment of clamping and injection units by rack and pinion. The unit also has safety doors and plug-in connection for heater.



Inclinable Presses

PRODUCTION on a new series of open back inclinable presses of 50, 75 and 100-ton capacity, has been announced by *Thomas Machine Mfg. Co.*, Pittsburgh 23.

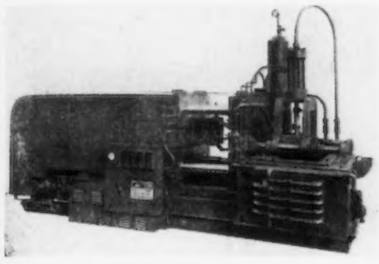


Construction features include a one-piece forged high carbon steel crankshaft of rigid design with ground and polished bearing surfaces. Large bronze bushed main bearings are of the 45° split type, transmitting the thrust directly to a semisteel frame. Lubrication is provided over the entire length of the adjustable gibs. The flywheel hub is so designed that the driving and backing blocks can be replaced when worn. A safety clutch permits single stroke nonrepeat, or continuous operation of the press; a safety stop has been incorporated in the shaft. The press illustrated is the 50-ton capacity model.

Hydraulic Diecasting Machine

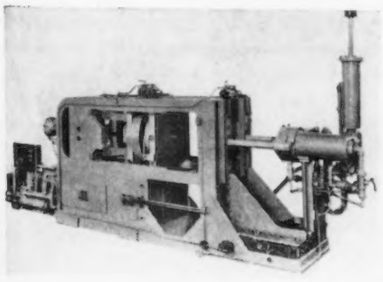
COMPLETE elimination of cold metal from the shot furnace, improved hydraulic performance, automatic timing and improved adjustable bearings for the movable platen are features of a new diecasting machine manufactured by the *Cleveland Automatic Machine Co.*, 2270 Ashland Ave., Cleveland, for zinc, tin, lead casting, or for magnesium, aluminum, bronze or brass. A double compartment furnace, on the zinc, tin-lead machine, with separate automatic burners for each compartment, does away with cold metal in the shot compartment. New metal is placed in

the second compartment, automatically causing the overflow of readied molten metal into the shot section, thus maintaining even temperature and uniform condition of the shot metal. Improved uniformity of hydraulic performance is achieved by addition of a new heat exchanger oil cooler. Ease of maintenance and modern appearance are improvements over previous models, with removable streamlined guards, permitting ready access to working parts.



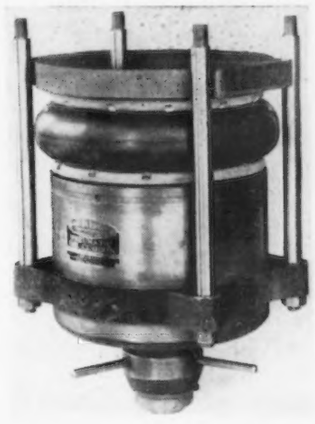
Diecasting Machines

TWO diecasting machines for the production of large, heavy castings are offered by *Lester-Phoenix, Inc.*, 2711 Church Ave., Cleveland 13. One is for zinc, tin and lead alloys, and the second for aluminum, brass and magnesium. The aluminum machine, illustrated, is equipped with the Lester prefill injection system, which injects metal at controlled speed and then applies pressure as it chills in the die, squeezing out shrinkage voids and trapped air and gases to eliminate porosity in the finished castings. This equipment develops injection pressure of 33,000 psi, applied to castings up to 40 in. in projected area. The hot metal injection system of the zinc machine, which can make castings up to 19 lb, has a one-piece cylinder and gooseneck of heat and corrosion resistant alloy semisteel casting with a high speed cylinder liner and plunger. Both machines have a one-piece cast steel frame, claimed to achieve the highest degree of rigidity ever developed in a diecasting machine, and a larger central die support with the movable die plate bearing on the four corners. The locking pressure possible within the frame is rated at 600 tons. Die movement and die space have been increased 60 pct.



Die Cushions

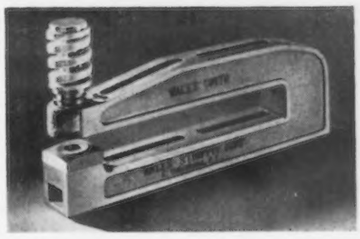
DAYTON Rogers Mfg. Co., 2835 12th Ave., S., Minneapolis 7, has developed the pneumatic bellows type die cushion, illustrated, which employs a molded synthetic rubber bellows in place of the conventional type piston and cylinder air jack. The bellows absorbs the die cushion travel of the hardened and ground pin pressure pad. The cushion, under test, is claimed to have flexed in excess of three million cycles without any appreciable deterioration of the synthetic rubber moldings and will stand working pressures up to 300 psi. The molding is not affected by oil in the air line, grease or other drawing compounds. These bellows air cushions are made in sizes from 5 in. to 12 in. having drawing capacities up to 5 in. and can be used satisfactorily, it is said, on all deep drawing jobs within their capacity, as well as pressure pad control on a large percentage of forming dies.



Self-contained, hydro-pneumatic die cushions for use when draw ring holding pressures in excess of the available shop air line pressure is wanted are also Dayton Rogers products. Through the use of hydraulic principles, it is claimed to be possible to obtain ring holding pressures on the hydro-pneumatic cylinder up to 400 psi from an 80 psi air line. These cushions can be adapted for high ring holding pressure, it is said, in the drawing of thin stainless steel and other thin stocks when the wrinkling of such material is excessive.

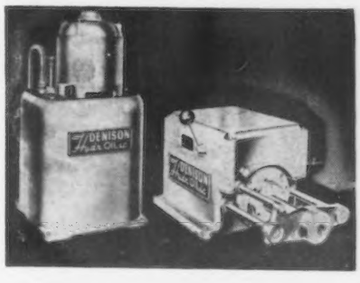
Hole Punching Unit

DESIGNED to pierce metal up to ¼ in. thick, heavy duty type BJ hole punching units have been announced by *Wales-Strippit Corp.*, 345 Payne Ave., North Tonawanda, N. Y. Each unit consists of a holder that carries the punch, die and stripping mechanism. This design is said to eliminate the necessity of attaching punch to press ram and assures permanent alignment of punch and die. Setups are made on T slotted plates or templates for stamping presses and on rails for press brakes. The units are available in three holder widths with maximum punch diameter of ¾ in. for use with metal up to ¼ in. thick.



Hydraulic Power Units

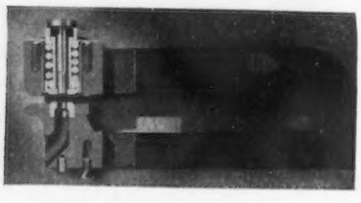
DENISON Engineering Co., 1160 Dublin Rd., Columbus 16, Ohio, has added to its line a group of packaged hydraulic press components in compact, unit form, known as Multi-Unit HydrOILic Power. These standardized press components include compact and easily moved pumping units in two models, and five models of power heads, all designed for mounting upon the user's machinery, in positions where their pressing actions



can be best utilized. Or, they can be mounted upon a standard Multi-Unit frame, thus permitting a variety of positioning arrangements of both units. The pumping unit, available in 4 and 6-ton capacities, incorporates electric motors, hydraulic pump, pressure regulating valve, reservoir for the hydraulic fluid, and oil level gage. The power head incorporates hydraulic cylinder and ram, hydraulic control valve, control lever, and ram action control devices, all fully enclosed. Travel of the ram may be regulated anywhere between a minimum stroke of 1/32 in. and a maximum of 6 in. When mounted upon the standard frame, this unit may be adjusted by means of spacers, between it and the frame, to obtain three different depths, 3½, 6 and 8 in. from ram centerline to throat of the frame. Three sizes of standard bolsters coincide with these three throat depths. Maximum daylight opening is 24 in.; minimum is 12 in. The frame may be used horizontally at two different heights, vertically, and vertically tilted at either a 10° or 20° tilt.

Self-Contained Punching Units

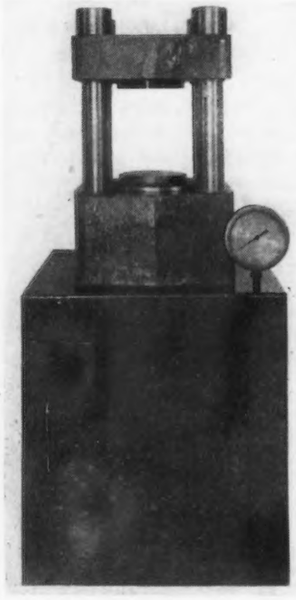
INDEPENDENT and self-contained type BL hole punching units have been announced by the *Wales-Strippit Corp.*, North Tonawanda, N. Y. The punches, dies, stripping guides, stripping springs and guide buttons are the component parts which are designed in the holders. These holders are said to automatically align punches and dies and keep them aligned. Unlike the conventional type die, nothing is attached to press ram. The only function of the ram is to depress the punch through the work.



Assembly operation is said to be simple, eliminating the usual methods of adjusting and setting required by conventional dies. The units may be set up on T slotted plates or mounting plates, in stamping presses and on rails or T slotted plated in press brakes. Combination setups of hole punching and notching are possible with BL units which are available in seven holder widths with maximum punch diameter of 2 in. for use with metal up to ⅛ in. thick.

Hobbing Press

A HEAVY-DUTY hydraulic hobbing press, model M13A, adapted for blanking, forming, drawing of heavy material, also for



laboratory use in testing materials for compression experimental work on plastics, rubber and other applications, has been announced by the *M. & N. Machine & Tool Works*, 146 Orono St., Clifton, N. J. This press is built without platen, so constructed as to permit the use of hardened steel pressure disks for hobbing purposes. It can be operated with a hand pump or an accumulator system. Model M13A is a 200-ton capacity press; opening between rods, 10 x 10 in.; ram stroke, 4½ in. Extra equipment includes steam platens and hardened pressure disks. The press is a self-contained unit with provision for pump and motor in the base. A 400-ton press, model M13AS, is also available.

Pull Broaching Head

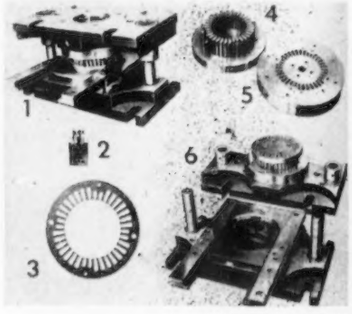
AN adjustable pull-head to make possible quick adjustment for off-center pull broaching on Colonial Utility broaching machines has been announced by *Colonial Broach Co.*, P.O. Box 37, Harper Station, Detroit 13. The device is said to permit broaching of keyways which require an off-center broach puller. The pull-head is interchangeable with the pull-down attachment available for Colonial Utility and Junior presses. Adjustment of the puller bracket in and out is by means of a screw with locking nuts.

Overload Safety Device

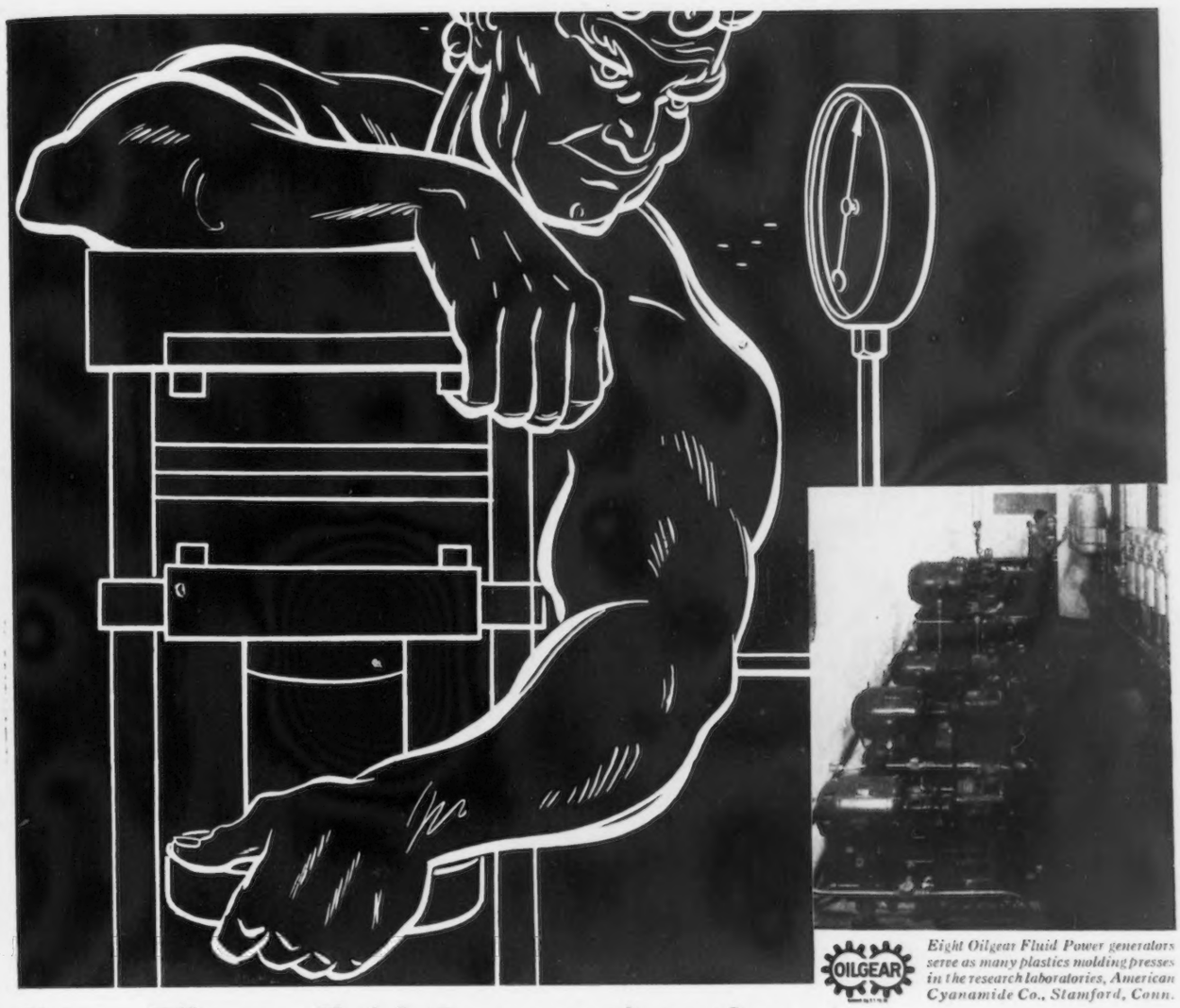
TO overcome the overloading of punch presses in sizes from 30 tons and up, a hydraulic overload pitman manufactured by *Dayton Rogers Mfg. Co.*, 2835 12th Ave., S., Minneapolis 7, has replaced the standard pitman or connecting rod usually furnished with punch presses. This hydraulic linkage not only prevents bending of the crankshaft and throwing other strains on the frame of the press, it is said, but also can be arranged to protect severe overload on the dies used in the punch press. This safety device is set to protect the maximum rated tonnage of the press. The overload value may be adjusted to any desired pressure and sealed to avoid tampering.

Lamination Dies

SEGMENTAL type lamination dies which feature removable and replaceable punches and segments have been announced by the *Crescent Tool & Die Co.*, 1780 Southfield Rd., Lincoln Park, Mich. The removable feature eliminates the necessity of replacing the entire punch buildup when one or



more segments become worn. Only the worn pieces need be replaced, thus making possible considerable economies to the user, it is claimed. The illustration shows several views of the die: (1) Front view of the die assembled; (2) die segments shown on the block; (3) the stator lamination; (4) punch buildup; (5) die buildup; (6) complete assembly in open position.



Eight Oilgear Fluid Power generators serve as many plastics molding presses in the research laboratories, American Cyanamide Co., Stamford, Conn.

Here, Oilgear Fluid Power points the way to better plastics products

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Assembly Line . . .

STANLEY H. BRAMS

• Production estimates seem fantastic in light of present shortages and interruptions over extended periods from strikes . . . Rash of parts shortages continues.

DETROIT—Estimates made a few months ago indicating that the automotive industry would produce 6 million passenger cars and trucks in 1947 had all but vanished this week. Even if automotive production had not been dealt a series of body blows by the GM strike, the steel strike, and now the coal strike, it is still unlikely that a 6 million car year would have been realized in 1947. There are many reasons why such an estimate contains an overdose of enthusiasm.

To begin with, forecasters of automobile output have had to assume there would be relatively continuous and uninterrupted automobile production. What has happened, of course, is that no automobile plants have been able to produce for extended periods without interruption and this is true of plants which have not been hit by strikes as well as those which have been struck. Take Packard, for example. This producer has not had a serious interruption in 1946 as a result of direct labor trouble. Nevertheless, the Packard plant in Detroit was closed down for about three months this year because of a lack of bearings which are normally supplied by Moraine Products Div. of GMC.

As K. T. Keller put it in a statement to Chrysler stockholders last week, "The present prospect is that output is now on the decline, due principally to the indirect effects of strikes and other factors. Most materials and component parts are in a state of chronic short supply, and the prospect for any substantial increase in the rate of production in the immediately foreseeable future is not good."

In forecasting automobile production for 1947 it has apparently been assumed that in the event work stoppages did not interfere, sufficient raw materials for such a program would be readily available. It now seems apparent that few people stopped to consider that 6 million cars have never been produced in a single year, that an unprecedented supply of specialized production tools would be necessary, that a greater amount of steel and copper and lead and tires would be demanded than has ever before been required by the motor industry. Most important, these unprecedented demands by the motor industry would occur at a time when other industries would also be seeking unprecedented amounts of materials.

What is being experienced in Detroit today and in other parts of the country is the cumulative effect of a run on our national bank of raw materials. The consequences of this concerted action by all industries is bound to result in conditions which the most able economists will find it difficult to forecast with confidence.

Naturally the optimistic forecasts were largely based on the tremendous pentup demand for cars. Now a grave question has arisen in the minds of many sales executives as to the size of the market. Widespread strikes have made a cruel cut in national purchasing power as workers' savings have dwindled. Prices have risen, despite OPA's efforts to hold the line, and the upshot of all price increases in the past has been to reduce the number of customers standing in line. One top auto executive said in private recently: "We've been kidding ourselves. The industry has got to go out and do a selling job to move its cars."

Meanwhile, the rash of parts shortages which has been breaking out all over the Detroit area continues without change in intensity or frequency. The only changeable factor in the situation is the name of the particular part which is currently in short supply. A few weeks ago, the bearings shortage was serious; for several weeks thereafter steel bumpers were practically unobtainable. A week ago, the shortage of automotive sheet was serious and this condition continues. This week, valve springs, wire for seats and nuts and bolts can be added to the list. As has been the case for many weeks, malleable and gray iron castings are tight and no relief is in sight.

Long established gray iron and malleable foundries in this area are having hard going these days. During the days of fat war contracts, Detroit gray iron foundries lost many of their employees to booming war plants paying higher wages. The alleged unattractiveness of iron foundry work only added to the difficulties of the foundries.

Since OPA came into the picture a new problem has emerged. Prices of gray iron castings are fixed at such low levels that repeat orders for business are not being accepted. This forces castings buyers to go to new suppliers, who then obtain OPA's permission to furnish the part at much higher prices. One

Auto Strike Loss

Detroit

• • • It is estimated that strikes in plants supplying Ford, Chrysler and Hudson have cost at least $702 million in production volume and wages alone. In the six months between Sept. 1 and Feb. 28 Ford workers lost $184,084,625; production losses were estimated at $242,739,000. Commissisons lost by Ford dealers because cars weren't produced were estimated at $48,547,800. The estimated loss at Chrysler Corp. was $255,200,000 in volume production; $9,363,200 in wages and $51,040,000 in commissions to Chrysler dealers throughout the country. Hudson Motor Car Co. workers lost an estimated $1,600,000 in wages during April because of the Midland Steel strike in Cleveland.

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result of all this changing of suppliers is the constant shifting of patterns from one foundry to another. The practice is so prevalent in this area that the term "pattern migration" is commonly used to describe the situation.

At the same time it is stated that OPA prices for some of the latest jobs have been so favorable a number of new foundries are starting up, using imported labor in a number of shops. At the moment, these new operators have taken a number of profitable contracts away from established plants in the Detroit territory.

It is difficult to see the end of the present situation but the immediate loss of much needed gray iron foundry capacity and the ultimate possibility of creating unstable foundry capacity is not being overlooked.

Be that as it may, there is one Detroit factor not so gloomy by national comparison. The effects of the coal strike will apparently not hit here quite as rapidly as elsewhere. The Detroit Edison Co. will not immediately cut the industrial power supply in order to conserve coal. The Edison Co. intended to put a brownout into effect this week, however, to conserve power normally used for advertising illumination.

Ward's Reports, Inc., estimated passenger car and truck production in the United States and Canada for the week ended May 4 at 67,585; a week ago, 64,620; production during the corresponding week of 1945 totaled 20,470. It was pointed out that automobile plant shutdowns resulting from fuel shortages and work stoppages in the plants of suppliers are slowly strangling the industry. A recent strike at Gemmer Mfg. Co., a leading supplier of steering gears for the automotive industry would, if prolonged, prove a serious blow to automobile production. The likelihood that estimated June production of 500,000 units would be realized seems fantastic in the light of present conditions.

Starts Pension Drive In Automotive Field

Detroit

• • • **A drive to establish** pension programs in the automobile industry has been gathering steam in the offices of the CIO United Auto Workers' Union.

Ford Local 600 has submitted to the new UAW president, Walter P. Reuther, the request to include a pension plan in forthcoming contract negotiations between the Ford Motor Co. and the union. A contract was drawn up between the parties earlier this year but thus far has not been ratified by the rank and file, and in the light of the present pension campaign conceivably might be rejected by the membership in favor of renegotiation to obtain the pension plan.

Earlier charges were made by the union that Chrysler Corp. was retiring a considerable number of men 65 yr and older. The company had no comment, but it was recalled that Chrysler instituted a retirement program for its workers before the war.

CAR OF THE FUTURE?—*The new automobile designed by William B. Stout does away entirely with sheet steel for the body, using fiberglas plastic for the outer sections. Frame is eliminated, the body itself performing this function. Mr. Stout maintains that in spite of the picture it is not a hair-raising experience to ride in his car—the wind just happened to be blowing that way.*

OPA Plans Price Action Soon for Woodworking Machinery Industry

Washington

• • • **OPA plans for relief** of the woodworking machinery industry are expected to be ready for announcement within the next two weeks.

The price agency's action, however, will be concerned with price adjustments rather than with outright suspension or removal of controls since OPA officials feel that decontrol of the industry cannot be brought about before late June or even July.

No price increases have been allowed the industry since October 1941 when prices of woodworking machinery were frozen at what the industry considered a low-cost period. In the meantime, wage and materials costs have advanced. These were placed at 46 pct for wages and 20 pct for materials by O. V. Haegg, president, Assn. of Manufacturers of Woodworking Machinery, who said manufacturers had been forced into other lines of goods.

OPA's forthcoming action will be based on the results of a survey it has conducted and is now studying.

Increase Tool Prices

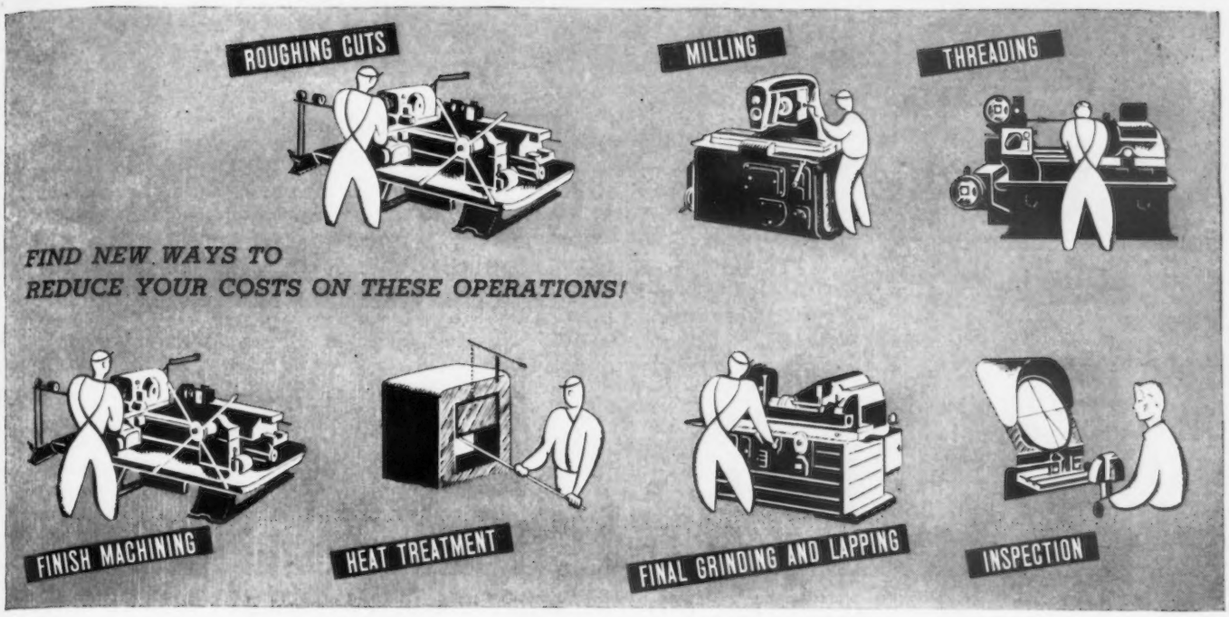
Washington

• • • **Effective May 7,** manufacturers of wood boring and cutting tools may increase their March 1942 prices by 17.3 pct, OPA announces. Resellers may pass on the exact amount of the resulting increase in their invoiced cost.

If a manufacturer stopped selling before March 1942, he may take his Oct. 1-15, 1941, price as a base.

Affected are manually operated auger bits, drills, drill bits and braces, wood borers, saws and saw frames, the ceiling prices of which are covered at the manufacturers level by consumer durable goods regulation.

The tools affected will go up by 8 pct and 9 pct at the retail level as a result of the increase. These items represent only about 2 pct of all cutting and boring tools manufactured.



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Washington . . . L. W. MOFFETT

• CPA says private industry financed $5.9 billion of $23.1 billion war plant expansion . . . Most of $17.4 billion investment is loss.

WASHINGTON — A report just released by the Civilian Production Administration summarizes for the American taxpayer just what the war cost him for the construction and expansion of war plants alone. Although receiving little more than passing attention in the general press, the report scotches a widespread opinion that the government bore the whole staggering cost. It reveals that private industry shouldered more than one quarter of the bill.

Based on its own figures and those of the former War Production Board, which it supplanted at the end of the war, the CPA report (War-Time Manufacturing Plant Expansion, Privately Financed) places the total wartime plant construction and expansion at $23.1 billion. Of this amount, private financing accounted for $5.9 billion worth, or approximately 26 pct of the whole.

Bitter though the dose may be, Mr. Taxpayer may as well reconcile himself to the fact that at least two-thirds of Uncle Sam's $17.4 billion investment in war plants represents almost a total loss. The CPA study sees only about a third of the wartime government-built industrial facilities as suitable for conversion to peacetime production.

It is pointed out that more than $11 billion of the total federal financing went into direct armament producing plants, products of which have no civilian use. In addition, experience to date in plant disposal indicates that on the salable properties only about one third of the original investment will be returned.

Contributing to the low rate of recovery of war plant expenditures was the high ratio of structural cost to that of equipment. Despite the rapid expansion during the emergency, there was little change in the cost ratio of privately-financed operations. Standing at 31.4 pct for structures and 68.6 pct for machinery and equipment in 1939, the war period ratio changed only to 33.6 and 66.4 pct, respectively, as compared with government expenditure of 44 pct for structure and 56 pct for equipment.

In the expansion process, privately-owned plants often installed sizable quantities of additional and new machinery which increased capacity without materially adding floor space or requiring new structures. On the other hand, the government owned only such facilities as a few shipyards and arsenals left over after World War I. With few exceptions, federally financed expansion meant that there had to be a vast outlay for housing tools and machinery.

Moreover, the privately-financed plant, while devoted to war production during the 1940-1945 period, was built with an eye on the peacetime market. Not having the unlimited capacity of the government to borrow on favorable terms, obviously enough, it confined its investments to expansion in fields which offered reasonable prospects for continued postwar production.

Industry did not consider either the favorable provisions of the amortization sections of the Internal Revenue Code or the possibilities of large wartime profits (this was later knocked out by renegotiation procedures) as justification for expenditures of corporate funds except in those instances where a long-term production could be foreseen. The federally-built plant, on the other hand, was primarily built to develop war potentials, particularly in the fields of strictly war materials.

This explains, in part, why war plant disposal has lagged and provides War Assets Administration with its biggest single headache in disposing of war surpluses. The explosives and munition loading shipbuilding, and gun and ammunition facilities obviously have limited peacetime application. Despite the continued growth of air travel, there is little possibility for full utilization of the war-created aircraft plants which the CPA estimates as having been enlarged to 39 times the size of the 1939 industry. Federal expansions in the automobile and automotive equipment groups were confined largely to production of tanks and armored vehicles.

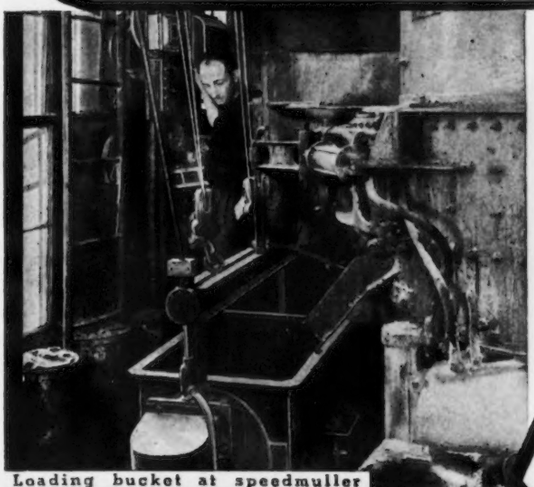
There is little reason or incentive for industry to purchase such facilities, regardless of attractive bargain prices. Its own $1¼ billion investment in armament and special-purpose machinery and equipment plants offers a sufficient reconversion problem. As of Apr. 1, only 223 of the government-owned plants had found buyers.

More important, perhaps, than the report's segregation of public and private financing on opposite sides of the ledger is the fact that it offers a clear insight into the present potential production capacity of industry.

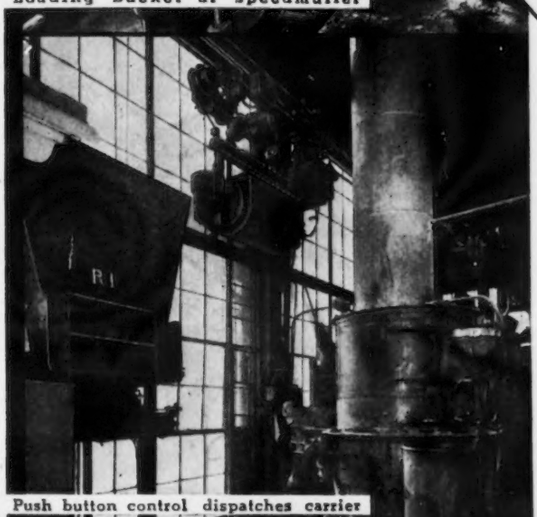
In 1939, the report states, private industry's plant investment stood at approximately $39.5 billion. Its 14,746 wartime expansions (not including those costing less than $25,000) raised the figure to a current total of about $45.4 billion. Virtually all the $5.9 billion wartime investment is being salvaged, that is, turned to civilian production. The report comments:

"This wartime construction, while increasing private industry's plant capacity by more than 15 pct, must be further expanded to meet the huge demand for consumers' goods and many types of machinery. . . . In addition to the commitments needed for restoring equilibrium, capital expenditures will have to be made in such major

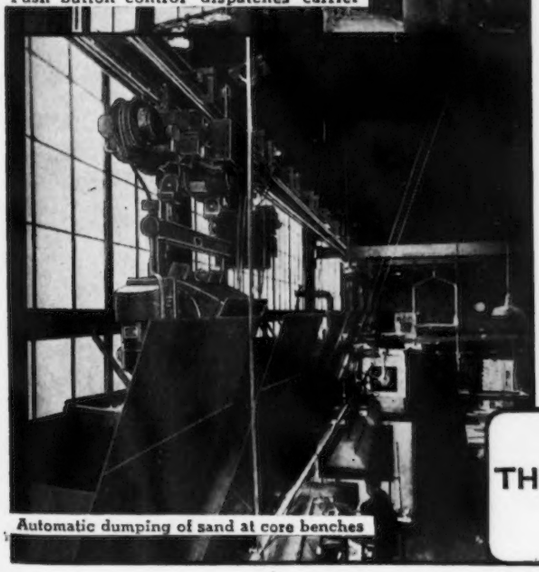
Automatic MONORAIL System



Loading bucket at speedmuller



Push button control dispatches carrier



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FROM a simple push button control, operator of speedmuller keeps nine core makers supplied with fresh core sand at all times.

This system operates as follows — Self-dumping bucket is lowered to floor at speedmuller to receive core sand. Operator raises bucket with twin hook hoist, sets the station selector and then presses starter button. The unit runs to the proper station and stops — bucket makes complete revolution dumping sand in hopper — whereupon the unit returns to loading station. All this operation occurs automatically, with no further attention from operator.

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manufacturing categories as consumers' durable goods and machinery of all types."

Commitments for wartime expansion by the iron and steel industry amounted to $953 million, including $313 million in new facilities for fabrication of iron and steel products. Among other large expenditure groups were machinery and electrical equipment, $550 million, and nonferrous metals, $371 million.

In the group in which private financing accounted for from 16 to 50 pct of the outlays are the basic metal groups, ferrous and nonferrous, and some metal-fabricating industries. This category also includes the combat and motorized vehicle group, in which the survey showed that the private war-period authorizations coincided roughly with peacetime capital commitments by the automobile and automotive equipment industries. As previously mentioned, federal expansions in this field were centered mainly in facilities for tanks and armored cars.

The CPA report saw a possibility of converting much of the materials handling and metal fabricating equipment to production of other industrial and agricultural machinery. Within the nonferrous metals group, however, the agency felt that perhaps the aluminum and magnesium industries may necessarily have suffered overdevelopment.

Private financing, it was pointed out, amounted to roughly 75 pct of the total facilities and wartime expansion increased basic aluminum production to five or six times the 1939 capacity of around 170,000 short tons. New markets would have to be developed for some 500,000 tons, perhaps at the expense of steel and other metals, if the plants were to continue to operate at anything approaching capacity, the survey indicated.

Before the report of CPA's survey was written, however, industry had already made its gamble, for better or worse. WAA announced recently that it has nearly completed the disposal of government-owned aluminum plants to private operators.

Since VJ-Day, the nation's problem admittedly has been one of production and still more production to meet the huge backlog of needs created by wartime scarcities. The CPA report reveals that throughout the war industry expanded on a sound basis looking forward to meeting these needs. In the past eight months it further added considerably to its $45.4 billion holdings by taking usable federal plants off the government's hands.

Its capacity is now at an all-time peak but is hampered by the lack of a firm governmental policy which in turn has led to reconversion blunders and shaky wage-price standards. It would appear that another Hercules is needed to clean the government's Augean stables.

•

Urges New Profit Rules For OPA Price Controls

Washington

• • • **Setting of specific profit** standards by Congress for the remainder of the price control period was recommended on Apr. 24 by Hugh Morrow, president of the Sloss-Sheffield Steel & Iron Co., Birmingham, before the Senate Banking & Currency Committee for the merchant pig iron industry for which he spoke.

Mr. Morrow said nothing short of such action would bring relief to producers and halt declining production. Asked what constituted a "fair" profit margin, he said he believed about 7 pct (before deduction of Federal taxes) on net worth was fair, but added that the opinion of no one man or group should be accepted.

Pointing out that pig iron is the foundation of many industries, he added that it is a serious bottleneck in the housing program. Using CPA figures, he said this year's requirements would exceed production by amounts variously estimated at from 750,000 to 2,000,000 tons.

Since pig iron ceilings went into effect in June, 1941, three increases totaling $2.50 per ton have been granted. This, he said, is $2.29 less than the adjudicated cost increase between 1941 and February, 1945, as compared with the $5 a ton awarded producers by Canada's Wartime Price & Trade Board. Steel wage increases alone, he said, have added about $2 a ton and probable coal wage increases will increase it still more.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

West Coast . . .

ROBERT T. REINHARDT

• Westerners try to assay Geneva bids and ferret out background of some of the "Unknowns" . . . Nonferrous metals strike not settled by recommended 18½¢ raise.

SALT LAKE CITY—Last week, Geneva, the illegitimate child of the steel industry whose mother was war-bred necessity and whose father was undoubtedly Uncle Sam, found that at least two old and respected families were willing to give her their honored names. The only slight she suffered was at the hands of a possible foster father who, at the time for bidding for the privilege of adopting her, said he was sorry, but he already had a problem child in southern California and couldn't afford to take on any more just now.

Throughout the West, general satisfaction has been expressed over the interest shown by both U. S. Steel Corp. and Colorado Fuel & Iron Corp., but some of the industrialists of this area expressed disappointment at the amount the corporation agreed to spend on new facilities at Geneva. The more optimistic had hoped for finishing facilities costing approximately $40 million. Realistic observers recognize that finishing facilities must be located where economics dictate regardless of who operates the plant. It is the opinion of California steel users and other industrialists, that if the corporation should be awarded the plant, development of its proposed $25 million cold-rolling facilities at Pittsburg, Calif., would be expedited. This plant would use the hot-rolled coils produced at Geneva.

See pp. 116-117 for additional news on Geneva Steel.

From a Utah standpoint the CF&L offer has the merit of calling for a larger additional investment at Geneva than would that of the corporation, according to some local businessmen. However, the fact that the corporation is offering to use its own money for direct purchase and that CF&I would want additional government investments and a lease arrangement over a 15-yr period, appears to have set up some sentiment in favor of the corporation taking over.

Western consensus seems to be that either of the offers made by these two old-line companies will give the West its long-sought source of sheets and other scarce products, but there is still a feeling prevalent in some quarters that neither of these two bidders can or will guarantee the lower delivered cost of steel on the Coast which has been a persistent hope of Western steel users. Members of the Steel Committee of the Western States Council were reluctant to express opinions on the bids until they had been given careful study. It is expected that this organization will exert whatever influence it can in favor of the offer it considers will best serve the needs of the West.

Regardless of what attitude the War Assets Administration may take toward the other bidders from the West, local industrialists are prone to discount them.

Perhaps the weirdest bid was that of the Blue Star Enterprises of Salt Lake City which even when reduced from the initial offer of $302 million to the revised figure of $202 million, was generally conceded to be a high offer for a plant valued by the seller at approximately $200 million. According to F. Henri Henroid, vice-president and secretary-treasurer of the company, the initial offer had been wired to WAA without his knowledge by Archie Poarch, president of the company. Mr. Poarch's explanation was that he had made the gesture on the advice of a friend who had some important connections in the East which might help finance such an offer. Mr. Henroid, who is also an attorney, is reported as having recommended that Mr. Poarch send the telegraphic withdrawal of the bid as soon as he heard his president's story.

Mr. Henroid stated that the Blue Star Enterprises had been organized to develop a small mining claim, that it was capitalized at $30,000, had assets of perhaps $5000 to $10,000 and that he personally had not heard of the Geneva bid until reporters started deluging him with requests for information.

THE Riley Steel Co. of Los Angeles, headed by Fred Riley, had been an unknown until its bid of $222,607,840 was entered for Geneva. Since this bid is apparently predicated entirely on RFC loans, local businessmen give it but little consideration. Mr. Riley created considerable conjecture during the past month when he appeared in Salt Lake City to investigate the Geneva plant. At that time he was noncommittal as to whom he represented. Principal steel men in the Los Angeles area disclaim any knowledge of his operations.

R. E. Clapp, a retired real estate broker of Los Angeles, heads the Assets Reconstruction Corp. which offered $38,750,000 for the plant. This bid is being interpreted here as a cash offer which makes it the second best to that of U. S. Steel's $47,500,000 bid. Little is known of this organization, but it is believed to be privately financed. Mr. Clapp is reported to be in ill health and not available for interview.

The principals of the Pacific American Steel & Iron Corp. of Seattle are Harry B. Murphy, his brother George Murphy, H. J. Landahl and Thomas Smith, all of whom have long been proponents of a steel plant in the Pacific Northwest. George Murphy is now head of the Portland Spar Co. at Portland, Ore., which manufactures masts, cargo booms and other shaped timbers on lathes he designed. George Murphy and Mr. Landahl are reported as having

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had the support of the late President Roosevelt for establishing a steel plant in Everett, Wash., but plans were abandoned when war was declared. Mr. Smith is a former King County, Wash., commissioner and now warden of Walla Walla penitentiary. The bid of the Pacific American Steel & Iron Corp. has been interpreted to be $40,498,622 but would require a loan of $25 million. The company is not listed in the Seattle telephone directory and its offices could not be located there.

•

Report of the nonferrous metals industry fact finding board recommending an 18½¢ an hr wage increase, plus an adjustment for track laborers in open pit operations from $6.15 to $6.70 a day, was greeted with stony silence by struck Utah operators. They are apparently prepared to sit it out a little longer waiting for price relief. One operator stated that the whole issue would still have to be negotiated and that he saw little hope of a quick settlement.

Economic repercussions from the strike, now more than three months old, are beginning to show up. The state tax commission estimates that the direct tax loss is more than $5000 a day and the indirect tax losses can't be computed. While only a small percentage of the striking mine and smelter workers are eligible for unemployment compensation, the shutdown of the major companies has sharply reduced payments into that fund. As a result, the outgo from unemployment insurance reserves has risen above income for the first time since the fund began its rapid wartime growth in 1941. The state treasurer reports that outgo is currently running about 40 pct above income. The reserve is above $25 million compared to less than $6 million in December, 1941.

The state's unemployment now stands at approximately 22,000, including approximately 5000 nonferrous metal industry strikers and 3500 idle coal miners.

SAN FRANCISCO — According to local scrap buyers the recent establishment of the special freight rate of $12.32 per long ton on scrap moving to the Middle West has had little, if any, effect on the scrap market. This is the rate protested by local scrap users before the ICC and which was temporarily suspended before it could be put into effect. The review by ICC resulted in its re-establishment for a four-month period.

While scrap prices on the Coast have firmed up considerably during the past few weeks, buyers attribute this to heavy local demand and to the reluctance of dealers to sell now in the hope of increased ceiling prices later. Some of the protestants of the temporary low rate consider they have achieved a minor victory in delaying its establishment until now when scrap is more readily gathered in the Middle West than in the winter months. The ICC ruling stipulates that the new rate applies strictly to scrap to be used for smelting purposes.

THE trend of business activity in San Francisco during the first quarter of 1946 was practically identical to that of a year ago, according to figures released by the San Francisco Chamber of Commerce.

There were, however, many changes and wide contrasts within individual fields between the two periods. Building permits, real estate sales and stock exchange transactions soared above last year while a decided settling occurred in several other fields, such as manufacturing industries, freight car movements, postal receipts and placements.

March index of general business activity rose to 218.0 compared to 189.6 in February and 218.1 in March a year ago. The three-month average of 204.9 was only 1.8 pct above last year.

While the machinists returned to work on Mar. 18 the regular monthly report on the manufacturing industries taken as of the middle of the month revealed the employment level in this field to be below the 1940 average. However, payrolls were up nearly 56 pct above 1940, but compared to last year the employment and payrolls were off about two thirds.

The number of wage earners reported as employed in the manufacturing industries as of Mar. 15 amounted to 83,000, of which 34,400 were in the durable industries and 48,600 in the nondurable. Compared to a year ago the average March weekly earnings amounted to $48.27 as against $59.77; average hourly earnings amounted to $1.27 as against $1.334; and average hours worked per week were 38 as against 44.8.

Industrial development projects during March announced by the Chamber's industrial department for northern California, totaled 158 projects, with total expenditures amounting to $11,316,000 or almost $5 million above March a year ago. These included 92 new plants with outlays of $6,518,000 and 66 expansions in established factories which will cost $4,798,000. Of the northern California March total, the San Francisco Bay area accounted for 136 projects valued at $9,221,000. The three months' cumulative for northern California climbed to 370 projects calling for outlays of $29,963,800.

LOS ANGELES—Howard Darrin, noted car designer, is reported as preparing to get into production on a five-passenger sports convertible, semi-custom built car using a new plastic top and trim materials. The body is to be made of fiber glass skin. Weight will be 2000 lb; wheel base, 105 in.; motor, 90 hp Continental; rear drive; hydraulically controlled window, bonnet and seats. The new car is to sell for about $2000, f.o.b. Los Angeles.

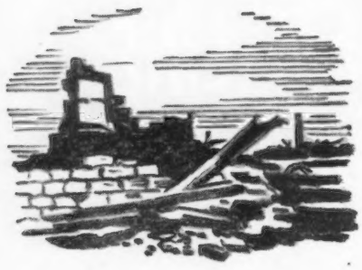
•

LOS ANGELES—The announcement of the appointment of Francis M. Rich, formerly with the Steel Co. of Canada, Ltd., as vice-president in charge of operations at the steel plant of Kaiser Co., Inc., at Fontana, Calif., has ended the conjecture as to who was to succeed Peer Neilsen, who was credited with exceptional results in the short time he held the position which was terminated by his death in an automobile accident.

Mr. Rich's career started at the South Works of the Illinois Steel Co. (now the Carnegie-Illinois Steel Corp.) immediately following graduation in 1925 from the University of Illinois, where he received the degree of bachelor of science in mechanical engineering. In 1938 he became assistant to the vice-president and works manager of the Steel Co. of Canada, Ltd., and in 1943 he was made assistant works manager of the Hamilton works of the company, which position he held until his present appointment.

European Letter . . . JACK R. HIGHT

• American steel exporters compelled to loaf while strikes retard output . . . British steel exports hit ever - rising totals as government pushes export drive.



LONDON—While European representatives of American steel firms relax in an atmosphere of enforced leisure, the British export drive is receiving substantial impetus through the efforts of the United Kingdom iron and steel industry. Latest statistics available for British exports covering the first quarter show the total rising by 310,240 tons to double the figure for the preceding quarter. The figure for the first quarter of 1946 is one sixth higher than in 1938, with exports to liberated countries representing about 35 pct of the total.

In the meantime American steel producers who had hoped that a generally favorable price picture in the international market and a virtually unlimited capacity would mean a first start in the world's markets are being bitterly disappointed. The successive impacts of the loss of 7½ million tons of steel ingots due to the steel strike, and possibly 2 million or more due to the coal strike, has put American producers in the position where they can assure little or nothing in the way of deliveries.

Typical of the position today is the description by one discouraged American salesman who indicates that a request for even a single ton of bars can be met with nothing better than a half-hearted promise of fourth quarter delivery, with neither the producer nor would-be consumer believing that the steel will actually be sent this year.

The possible benefits indicated by a comparatively low American price range are being almost completely negated by the "unfortunate" terms of sale which are characteristic of American practice. It is the historic economic argument against trade with the U. S. that plagued America after the last war. Europe cannot buy American because it cannot pay American. Fundamental difficulty is the old stand-by, the dollar shortage. Few people have them and fewer of those who have them can get permission from their governments to spend them.

In the development of the new postwar trading agreements among countries on this side of the Atlantic, terms are being dictated by economic reality. When an important exporting country such as Belgium knows full well that it must export to live, it develops international trading agreements which make it possible for customers to pay. Thus with the help of agreements embodying reciprocal benefits Belgium is today officially exporting 40 pct of its steel output, and some observers feel that the figure is actually nearer 60 pct.

It is in Britain that the crying need for "exports to live" is best realized (See THE IRON AGE, Nov. 29, 1945, p. 82). Monthly export statistics are anticipated here by columns of newspaper predictions that the previous month's export drive totals will increase or will decrease. The issue is carefully watched and is considered next to housing to be the No. 1 barometer of the success of the Labor Government.

THE reports on the total export program for March were controversial, due to the somewhat shorter preceding month. The total cost of exports was $28,000,000 higher than for February, but the daily average showed a less encouraging picture. The government admitted that the daily average was small, but called it adequate. The critical section of the press objected, as could be expected.

Taking the first quarter as a whole, British exports were estimated officially as amounting to 81 pct of the 1938 rate. The increase of March exports over the previous month was essentially due to a $32,000,000 increase in manufactured goods. The March figure for this group of exports was the highest for over 20 yr.

London

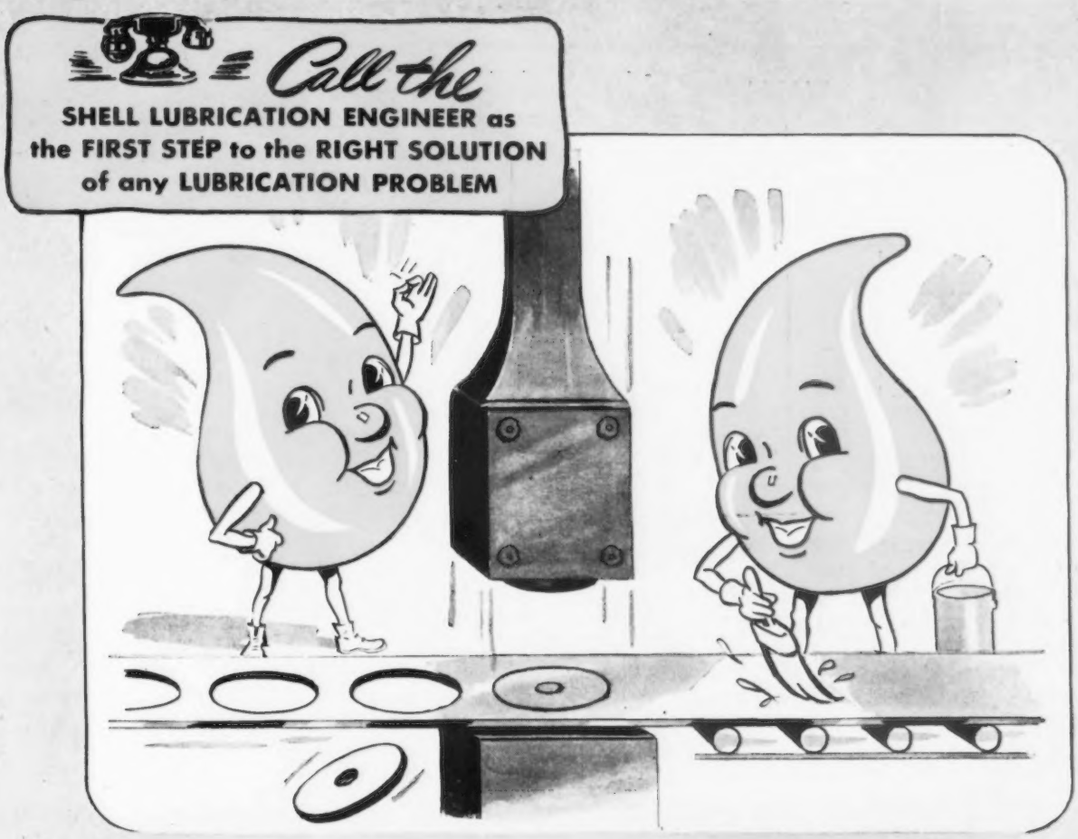
• • • It will take 100,000 workers to carry out the plans for rebuilding Berlin, according to the Berlin "Nachtexpress." Work will begin immediately and $67,200,000 have been allocated for expenditure, of which $11,200,000 will be spent on repairing and rebuilding dwelling places.

The outstanding increase was for vehicles with a $8,400,000 increase over February. The March total of vehicle exports was the highest by value since 1922. The vehicle group became, for the first time, second only to machinery as the largest contributor to British exports.

Iron and steel export increases were general through a number of lines. Most important increases were for rolling mill products. Exports of rolled steel were the highest since 1929 and were more than double the 1938 average. The amount of railway material exported was the highest since 1930, and more than twice that of 1938. Much of this increase was due to increased shipments to the Union of South Africa and to Southern Rhodesia.

Exports of wrought tubes and of wire and wire products were slightly higher than in 1938, showing a substantial improvement for the first quarter over the previous period. Shipments of galvanized sheets remained negligible, although it is notable that a trickle has started to some markets. The quantity of tinplate exported was also small, despite doubling the total for the last quarter of 1945. Table I summarizes the export position for the iron and steel industry.

A SHARP rise in machinery production brought the total quantity of exports from slightly over half the 1938 value to only about one sixth below it. Exports to India and to the Union of South Africa together accounted for over



BURRING and BURNING ELIMINATED with SHELL METAL-WORKING OIL

PROBLEM: Stainless-steel strip, 3" wide, ¼" thick (Type 4 SAE-51710), was used for simultaneous blanking and piercing butterfly valve parts with a mechanical-ram, sheet-metal press at the rate of 120 blanks per minute. *Unlubricated strip produced badly burred blanks—die was dangerously overheated.* Slower speed would solve heat problem but not burring.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem he recommended a Shell Garia Oil. This was applied with a paint brush to the top of the strip, just ahead of the stamping. All burring and overheating ceased. Manufacturer completed 60,000 valve parts, at the rate scheduled, without renewing dies.

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for informative literature on Shell Metal-Working Oils. Shell Oil Company, Incorporated, 50 W. 50th St., New York 20, N. Y. or 100 Bush St., San Francisco 6, Cal.

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TABLE I

Iron and Steel	Value	Quantity			
	One Quarter of Year 1938	Quarterly Average		Fourth Quarter 1945	First Quarter 1946
		1938	1945		
	$ million	Thousand net tons			
Crude iron and steel	2.4	39.2	13.4	13.4	36.9
Uncoated plates and sheets	3.2	58.2	28.0	52.6	100.8
Other rolling mill products	3.6	68.3	43.6	96.3	170.2
Galvanized sheets	2.8	41.4	....	1.1	3.3
Tinned plates	8.0	91.8	8.9	14.5	26.8
Pipes, cast	1.2	25.7	6.7	14.5	17.9
Tubes, wrought	5.2	61.6	22.4	39.2	69.4
Railway material	2.0	44.8	23.5	41.4	106.4
Wire and wire manufactures	2.8	23.5	5.6	10.0	25.7
Other goods	10.4	81.7	28.0	35.8	71.6
Total iron and steel	41.8	536.2	180.1	318.8	629.0

one third of the total increase. Increases for various classes of machinery were general, but the totals exceed those for 1938 only in the case of agricultural machinery, where relief shipments to Burma, Yugoslavia and Czechoslovakia were important.

Nonferrous manufactured articles are also being exported from Britain at a rapidly accelerating rate. Shipments of brass and copper manufactures according to statistics for the first quarter show the postwar exports in brass goods two and a half times as great as in 1938, and in copper three times as great. The rise for brass exports is officially attributed to increased shipments to France and the Netherlands, while the increase for copper was wholly due to the incidence of shipments for Russia. There were no copper shipments to Russia in the last quarter of 1945.

Tin shipments were well over double those in the preceding quarter due to shipments to Poland, Yugoslavia and Czechoslovakia, for the rehabilitation of industries in those countries.

The value of exports of electrical goods rose by $14.4 million to more than double the 1938 average, but allowing for the rise in prices the volume of exports was higher only by about one third. Exports of passenger cars have been rising by about 1000 a month, the figures for the individual months of the quarter being 1230, 2278 and 3271; the March figure was only one tenth below the 1938 average. A similar increase of 1000 a month has been recorded for commercial vehicles and chassis, exports rising from 1477 in January to 3496 in March. In the aggregate exports in the quarter were double the 1938 figure, but whereas chassis then comprised 80 pct of the total, complete vehicles now represent about 60 pct.

Exports of motorcycles rose to more than double the 1938 figure, largely as a result of supplies to liberated countries in Europe (mainly the Netherlands and Poland). There was also a substantial increase for bicycles, the March figure being two fifths higher than in 1938. Exports of locomotives and of locomotive parts were also larger than in 1938, three quarters of the total tonnage going to South Africa. Table II summarizes metal goods exports.

In the face of such totals, which the government is fostering with all the care of a first mother, it is no wonder the American exporters here are wailing. Their attitude is in contrast, however, to the constant pressure of the British government who looks upon the export totals described above as entirely inadequate. The totals, which are now beginning to break over the 1938 levels for many groupings, in few cases approach the levels that are ultimately required.

To balance its increasing need for imports Britain is planning to expand exports eventually to 75 pct above the 1938 level.

TABLE II

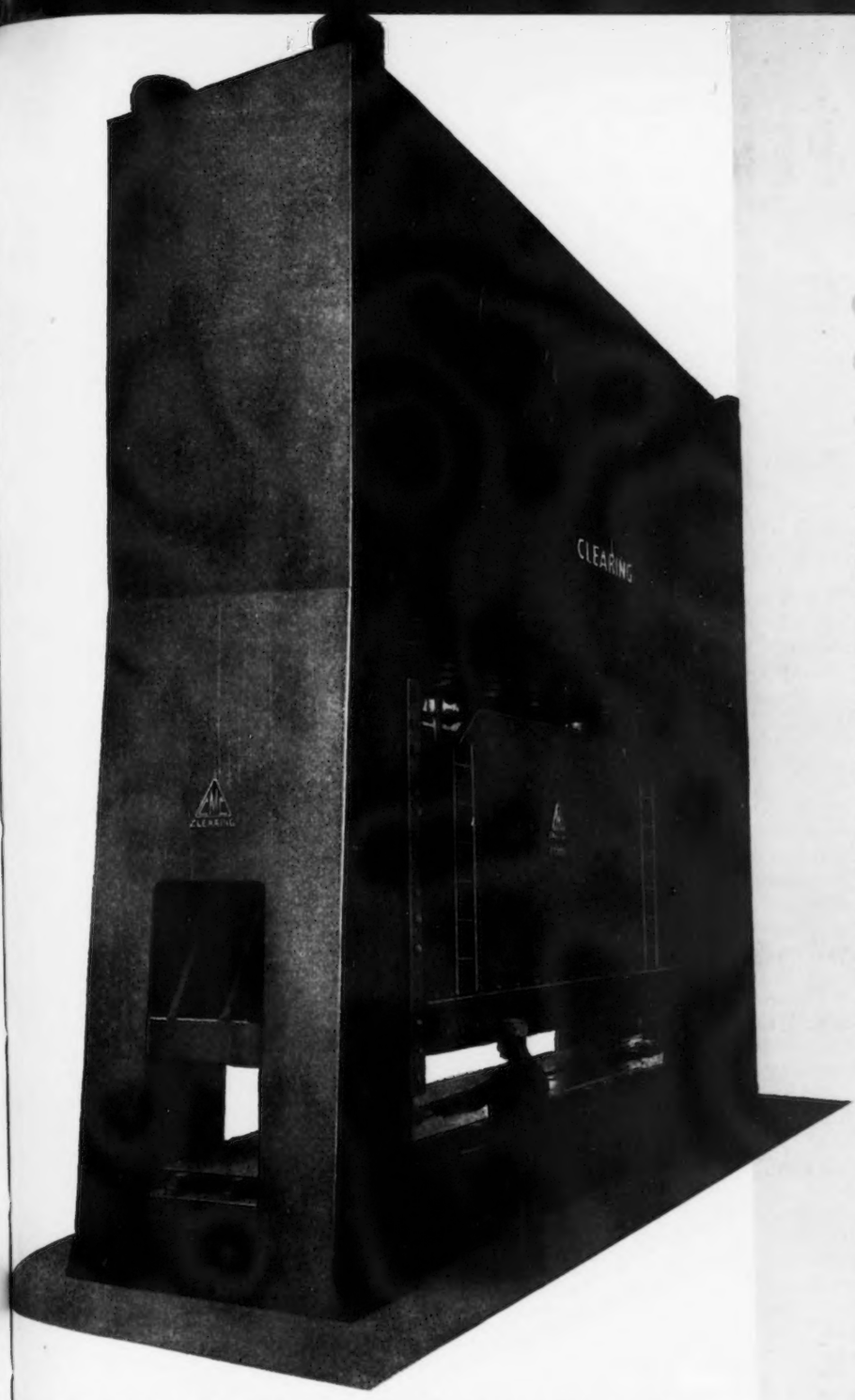
Miscellaneous Metal Goods	Quarterly Average		Fourth Quarter 1945	First Quarter 1946
	1938	1945		
	Thousand net tons			
Brass and brass manufactures	6.0	3.6	7.0	14.6
Copper and copper manufactures	9.0	5.3	9.4	27.2
Nickel, unwrought	3.4	1.1	1.9	1.1
Tin blocks, etc.	3.4	2.4	1.1	2.6
	$ million			
Electrical goods	13.6	13.6	15.2	29.6
	Units			
New motor cars	11,034	488	1,690	6,779
Commercial vehicles and chassis	3,572	1,629	2,938	7,466
Second hand motor vehicles	1,781	1,305	4,384	3,580
Motor cycles	4,943	987	2,942	10,031
Pedal cycles	144,000	68,000	105,000	205,000
	Thousand net tons			
Locomotives and parts	6.7	4.0	5.8	10.8
	Thousand gross tons			
Ships and boats (excluding war vessels)	47	.....	1	5

Federation Plan Calls For American Imports

London

• • • **The British Iron** & Steel Federation plan for modernization of the British industry which seems likely to be followed by the government, although it was not good enough to prevent nationalization, will probably call for a small amount of key imports from America. Lack of these imports, particularly of certain rolling mill equipment, would delay the construction and modernization program as much as 2 yr. The plan limits its requests for import authorization, perhaps because it recognizes that the government would not approve them in view of the present dollar shortage.

The industry has predicted in the plan that it would be able to raise 50 pct of the $672 million cost from its own resources, and anticipated no difficulty in raising the remainder through the sale of securities.



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- 7½ SECONDS PER STROKE CYCLE

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Like size, tonnage capacity is again only a basic factor in meeting the physical requirements of the work to be done. Building this Clearing Rail Press with a 3000-ton capacity was not of course a commonplace task . . . but Clearing has already built presses of other types up to 6000-ton capacity. If work should demand them, Clearing Presses of greater capacities could be built just as well.

• Clearing can always supply easily your press requirements in size and pressure. The important point to remember is that Clearing engineering can take your press design problem and go well beyond basic specifications . . . and give you operating speeds and precision results that provide tangible manufacturing advantages. For example, the Rail Press illustrated provides an operating speed that is approximately 33⅓% faster than other known presses of this type and size.

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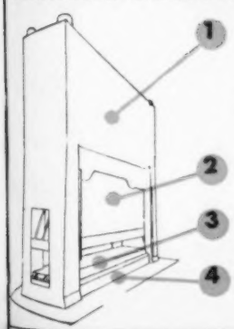

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PERSONALS

FRANCIS M. RICH, vice-president in charge of operations, Kaiser Co., Inc.

• **Francis M. Rich,** formerly with the Steel Co. of Canada, Ltd., has been appointed vice-president in charge of operations at the iron and steel plant of Kaiser Co., Inc. at Fontana, Calif. He succeeds the late Peer D. Nielsen. Mr. Rich's career started at the South works of the Illinois Steel Co., now the Carnegie-Illinois Steel Corp. He then became associated with the Wisconsin Steel Co., the Youngstown Sheet & Tube Co. and later with Republic Steel Corp. In 1938, he accepted the position of assistant to the vice-president and works manager of the Steel Co. of Canada, Ltd., and in 1943 was made assistant works manager of the Hamilton works of the same company, which office he held until his present appointment with Kaiser Steel.

• **William A. Scheuch,** formerly vice-president of Nassau Smelting & Refining Co., New York, a subsidiary of Western Electric Co., has been elected president of Nassau, succeeding **Frederic W. Willard,** who retires after 40 yr of service in the Bell system. **George J. Boileau,** treasurer, was elected vice-president and will succeed Mr. Willard on the board of directors. **E. F. Baxter** was elected treasurer and **E. F. Stoker,** assistant treasurer.

• **Kenneth N. Macomber** has been appointed chief engineer of the Lapointe Machine Tool Co., Hudson, Mass. He was formerly chief service engineer.

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• **Theodore E. Mueller** has been elected president of the American Radiator & Standard Sanitary Corp., Pittsburgh. He formerly held the post of vice-president, general manager of manufacturing Mr. Mueller succeeds **Henry M. Reed** who, since 1938, has been both president and chairman of the board of the corporation. Mr. Reed will continue as board chairman.

• **James A. Clark** has joined the operations staff of Vanadium-Alloys Steel Co., Latrobe, Pa. For the past 4 yr, Mr. Clark has served in the Army Ordnance Dept. at the Watervliet and Watertown Arsenals as assistant production superintendent and production metallurgist respectively.

• **Walter J. Dreves** has been made director of finance and controller, International Plastic Corp., Morristown, N. J. He was formerly vice-president and controller of Elastic Stop Nut Corp. of America.

• **Charles L. Heater,** vice-president of American Steel Foundries, has been made a member of the board of directors of General Steel Castings Corp., Eddystone, Pa. **Einar G. Hallquist,** for many years head of the corporation's engineering dept. has been elected vice-president in charge of the Commonwealth plant at Granite City, Ill. **Karl S. Howard,** recently assistant vice-president, has been elected vice-president to continue in charge of general mechanical and purchasing activities of the company.

• **E. C. Wilson,** formerly district manager, Warner & Swasey Co.'s Detroit office, has been transferred to the main office at Cleveland as assistant sales manager to head the company's national sales program. **I. T. White,** formerly district manager in the Buffalo office, is now in charge of Detroit sales. **Alexander Sellers, Jr.,** field engineer at Detroit, replaces Mr. White. **L. M. Cole,** formerly in charge of the company's office at Houston, has been made southern district manager. **H. M. Worstell,** field engineer at Newark, N. J., has succeeded Mr. Cole.

• **P. G. Hall** has been elected president, Hall Planetary Co., Philadelphia. Other officers elected are **Henry J. Leisner,** vice-president and secretary, **Herman J. Ries,** assistant secretary, and **Charles K. Lennig, Jr.,** treasurer. **Grosvenor S. McKee** was elected chairman of the board of directors.

• **Thomas F. Plummer** has become production manager for International Plastic Corp., Morristown, N. J. Mr. Plummer was plant manager of the H. B. Catty Corp., Norwalk, Conn., before joining the International Plastic Corp.

• **Thomas M. Fallon** has been appointed advertising manager for the Dravo Corp., Pittsburgh. Mr. Fallon succeeds **Fred C. Cole,** who has resigned. **Edward P. Pearsall** has been named assistant advertising manager for the corporation.

• **Joseph G. Paule** has been elected to the board of directors of the Wilson Foundry & Machine Co., Pontiac, Mich. Mr. Paule has served as secretary-treasurer since joining the company in 1937 and will continue in that capacity.

• **Graydon Megan** has been elected secretary of Inland Steel Co., Chicago, succeeding **J. H. Morris,** who has retired after 28 yr with the company. Mr. Megan joined Inland in 1938, returning last October after 3½ yr with the U. S. Army.

GRAYDON MEGAN, secretary, Inland Steel Co.

• **Howard R. Meeker** has been elected president of the J. D. Adams Mfg. Co., Indianapolis, succeeding **Roy E. Adams,** chairman of the board and former president. Mr. Adams retains the office of chairman of the board. Mr. Meeker has been with the company for 33 yr serving as factory manager, division sales manager, general sales manager, and since 1939, as executive vice-president.

• **Marshall M. Smith,** who recently returned from Great Britain and France where for the past nine months he managed the operations of the British and French companies of the E. W. Bliss Co., Brooklyn, has been named assistant general sales manager. Mr. Smith will be located in the company's newly established executive offices in Detroit. He will continue to supervise all Bliss export sales as well as the foreign operations at the company's Derby, England and Paris, France, plants.

• **Robert K. Yeck** has been appointed technical service representative for New Mexico by Turco Products, Inc., Los Angeles. Mr. Yeck's headquarters will be in Albuquerque.

• **John W. Burley, Jr.,** has joined the technical sales force of the Quaker Chemical Products Corp., Conshohocken, Pa. **Dorian C. Wilkinson,** recently released from the Navy has resumed his position as a process engineer for the company.

MELVIN C. HARRIS, vice-president in charge of production, Allegheny Ludlum Steel Corp.

• **V. W. Moody, Jr.,** has been named assistant to G. S. Nagle, assistant vice-president in charge of manufacturing, foil div., Reynolds Metals Co., Richmond, Va. Prior to his present assignment, he was eastern div. sales manager of the foil div. for Reynolds, with offices in New York.

• **Fred H. Paulson** and **Curtis H. Weissinger** have been appointed sales engineers in the refractories division of Norton Co., Worcester, Mass. Both will have their headquarters at the Worcester office.

• **Harvey C. Knowles,** a director and vice-president of Procter & Gamble Co., has been elected a director of the American Rolling Mill Co., Middletown, Ohio.

• **Walter R. Fidelius** has been appointed assistant chief engineer by the Optimus Equipment Co., Matawan, N. J. Mr. Fidelius was formerly with the Fitzgibbons Boiler Co., Inc., of Oswego, N. Y., for 13 yr as maintenance engineer and later as superintendent of the tank hall dept.

• **Milton H. Smith** has been named supervisor of fork-type lift truck engineering for the Hyster Co., Portland, Ore. Before joining the Hyster Co. 4 yr ago, he was chief engineer of the Hydraulic Equipment Co. at Cleveland.

• **E. J. Sanders** has been appointed western manager of the Thermo-Aire Div. of Evans Products Co., Detroit. He will have offices at Los Angeles. **William A. Lippman,** formerly with the Sky Products Div. of Evans Products Co., will assist Mr. Sanders. **Frank Dolinich** has been made assistant to J. J. Brandon, eastern sales manager of the Thermo-Aire Div., with offices at Cranford, N. J. Mr. Dolinich was formerly with the experimental laboratory of Mack Truck Co. and **Frank A. Chase** has been named central sales manager of the division, with offices in Cleveland.

• **Marvin A. Heidt** has been elected vice-president in charge of industrial relations of Bendix Aviation Corp., Detroit. He joined the Bendix organization in 1939 as director of industrial relations.

• **Victor Matulaitis** has been appointed division sales engineer of the Eaton Mfg. Co., Cleveland.

FRANK B. LOUNSBERRY, vice-president in charge of methods and processes, Allegheny Ludlum Steel Corp.

• **Frank B. Lounsberry,** formerly vice-president in charge of manufacturing, has been elected to the newly created office of vice-president in charge of methods and processes, Allegheny Ludlum Steel Corp., Pittsburgh. **Melvin C. Harris** has been made vice-president in charge of production, and **E. J. Hanley,** vice-president, finance. Mr. Hanley also continues as secretary and treasurer. **Clark W. King** has also become a vice-president of the company. Mr. Lounsberry who was vice-president and production manager of Atlas Steel Corp. in 1924, assumed a similar position at Ludlum Steel with the merger of the two companies and in 1938 became vice-president and operating manager of Allegheny Ludlum Steel Corp., Watervliet and Dunkirk plants. In 1942 he was named vice-president in charge of manufacturing for the entire company. Mr. Harris who joined Allegheny Steel Co. in 1915, subsequently held managerial positions at the Brackenridge plant and in 1944 became production manager for the company where he served as assistant to Mr. Lounsberry. Mr. Hanley became secretary of the corporation in 1936 and secretary and treasurer five years later.

• **Lucille Bell** has been appointed advertising manager for the Washington Steel Corp., Washington, Pa.

• **Herman L. Moekle,** secretary of the Ford Motor Co., Detroit, has been elected vice-president, in charge of finance, **John R. Davis,** director of sales and advertising, has been named vice-president, sales and advertising, **John S. Bugas,** director of industrial relations, has been named vice-president, industrial relations, and **Albert J. Browning,** recently appointed purchasing director, has been made vice-president, purchasing. **L. E. Briggs,** assistant to the secretary, has been named treasurer to fill a vacancy created by the appointment of **B. J. Craig** as manager of the Ford nonprofit enterprises. **H. E. Schluchter** has been named secretary succeeding Mr. Moekle, and **Fred A. Thomson,** secretary of the Ford Foundation, has been named assistant secretary and assistant treasurer of the company. **Gordon Cornwell,** assistant auditing dept. head, has been named auditor succeeding Mr. Briggs. **W. S. James,** director of research, was appointed to the staff of Henry Ford II, responsible to the president for all research.

• **Charles H. Colvin** has been elected to the board of directors of the Kidde Mfg. Co., Inc., and the Bloomfield Tool Corp., both of Bloomfield, N. J. He succeeds **Clayton Freeman,** who has resigned due to ill health. Mr. Colvin was the founder of the Pioneer Instrument Co. in 1919 and its president and general manager from 1919-32. Since 1944 he has been an engineering and administrative consultant to the U. S. Navy Bureau of Aeronautics.

• **W. D. Jones** has been appointed manager of the Industrial Tire & Track Div. of the B. F. Goodrich Co., Akron, Ohio. With the company since 1942 as a sales engineer on rubber tracks, he succeeds **Charles H. Kanavel,** named Los Angeles district manager for the Automotive, Aviation and Government Sales Div.

• **Sydney T. Maunder** has been named manager of sales, power transformer section of General Electric Co. at Pittsfield, Mass. He succeeds **Temple O. Eaton** who has resigned to become manager of the John Bean Mfg. Div. of the Food Machinery Corp. of Lansing, Mich.

L. M. ALEXANDER, manager of sales, Bolt and Nut Div., Sheffield Steel Corp.

• **L. M. Alexander** has been made manager of sales, Bolt and Nut Div., Sheffield Steel Corp., Kansas City. Mr. Alexander has been associated with Sheffield for 21 years, working for a short time in production before entering general sales. He soon transferred to the Bolt and Nut Div. sales, occupying the position of supervisor.

• **R. W. Biggs** has been named works manager of the Ambridge, Pa. plant of National Electric Products Corp., succeeding **Neil C. Lamont** who has retired. Mr. Biggs was formerly works manager of the Jones & Laughlin Steel Corp.'s McKeesport, Pa. works.

• **Lewis R. Brown,** for 23 yr manager of the Transformer Div. of General Electric Co., Pittsfield, Mass., has been transferred to the staff of W. V. O'Brien, manager of the company's central station divisions. He has been succeeded by **Harry F. McRell,** associated with the company since 1910.

• **Burt Perry** has joined the Industrial Div. staff of Kerkling & Co., Burbank, Calif. For the past 7 yr he has served as field engineer for American Bosch and Fairbanks-Morse & Co.

• **James G. Sherman** has been appointed vice-president in charge of manufacturing for the Elgin Watch Co., succeeding **P. E. Stringer,** who has retired after 53 yr with the firm.

• **Fred M. Fries** and **Walter L. Zeedyk** have been appointed research and development engineer and service manager, respectively, of the Conlon Corp., Chicago. Mr. Fries formerly was plant engineer of the Allied Chemical & Dye Corp., Barrett Div., engineer of the Binks Mfg. Co., and a designer for the Goss Printing Press Co. Mr. Zeedyk joins Conlon after Navy service in the South Pacific which was preceded by several years with the Edison General Electric Appliance Co., Inc., Chicago.

• **Kimball D. Smith,** general manager Worcester Wire Works Div. of National Standard Co., has been transferred to the Akron, Ohio, plant. **M. E. Murphy,** formerly of the Standard's Clifton, N. J. plant, succeeds Mr. Smith at Worcester.

• **John H. Collier** has been elected chairman of the board, Crane Co., Chicago, with which he has been associated for 43 yr. Succeeding Mr. Collier as president is **J. L. Holloway,** formerly vice-president in charge of the Finance and Control Div. **C. R. Crane, II,** vice-president, has been named a director.

• **James B. Robarts** has been appointed general superintendent in charge of operations for the Superior Sheet Steel Co., Canton, Ohio. He succeeds the late J. Hugh Hill.

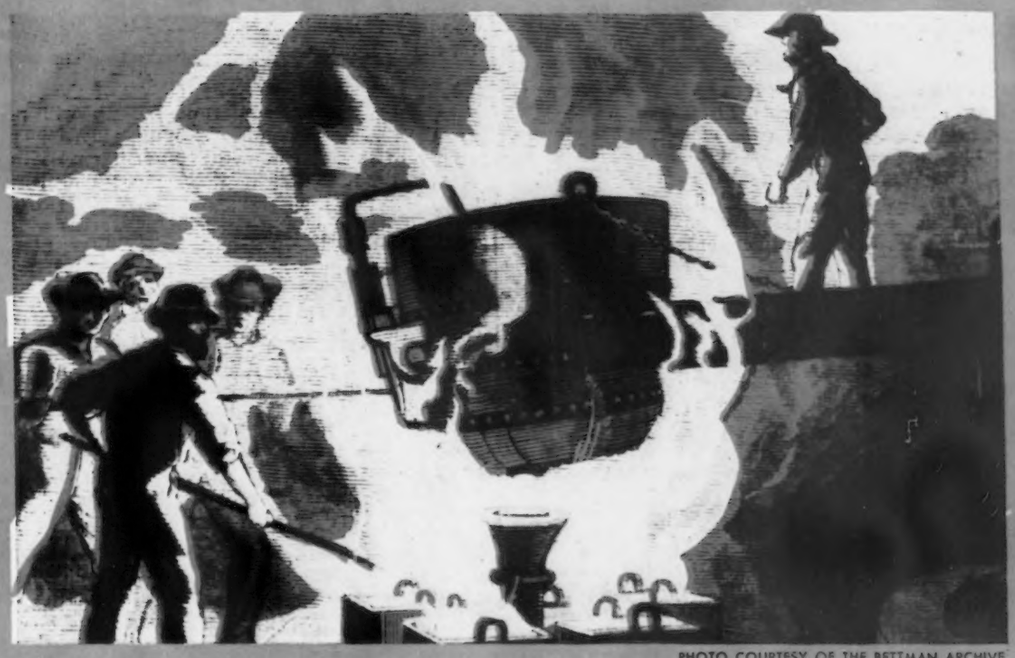
OBITUARY...

• **John J. O'Brien,** founder and retired chairman of the board of the South Bend Lathe Works, South Bend, Ind., died April 24.

• **Edwin L. Davis,** 78, associated with the J. Stevens Arms Div. of the Savage Arms Corp., Chicopee Falls, Mass., for 48 yr died recently.

• **J. Hugh Hill,** 46, general superintendent of the Superior Sheet Steel Co., Canton, Ohio, died Apr. 16. He had been with the company since its organization.

• **C. J. Rice,** 60, president and general manager of Sterling, Inc., Milwaukee, for the past 25 yr, died Apr. 21.



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FROM A METAL MAKER'S "FAMILY ALBUM"

WHEN OPEN HEARTH STEEL WAS AN INNOVATION—

"Standard" Was Doing Business at its Present Stand

This picture, drawn in 1876, shows a busy time at the pouring pits. It's possible that the metal came from one of the early open hearth furnaces, for they had recently been introduced in America.

Always a pioneer, Standard Steel quickly recognized the commercial advantage of the new steel, discontinued the operation of its crucible plant, and began to manufacture tires from open hearth steel.

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BLW THE BALDWIN GROUP **BALDWIN**

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The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Norfolk.

"STANDARDIZE ON STANDARD" FOR YOUR FORGINGS AND CASTINGS

Dear Editor:

GERMAN SLAG BRICK

Sir:

On the "Dear Editor" page of the issue of Mar. 28, M. J. R. Morris asks for further information on the German practice of making brick from slag. I am happy to be able to assist Mr. Morris by referring him to a fairly recent paper on this subject by F. Schwartz, which appeared in the German journal Ziegelei Anzeiger, vol. 55, pp. 61-62, 1942. This paper was abstracted in Stahl u. Eisen, vol. 63, p. 225, 1943, and also in Ceramic Abstracts (American Ceramic Society) vol. 23, pp. 13-14, 1944.

G. R. HARRIS,
Patent Attorney
Jones & Laughlin Steel Corp.,
Pittsburgh

● Thanks for the information, Mr. Harris. We are forwarding your references to reader Morris.—Ed.

STEEL DENSITY

Sir:

We are interested in certain phases of standard steel mill practice . . . We are particularly interested in obtaining steel densities at various temperatures (1000° to 2500°F) and information as to the change in density of steel as a result of rolling operations.

S. ALLAN
Linde Air Products Co.,
Newark, N. J.

● Vol. 2, p. 571, of "Alloys of Iron and Carbon," contains a chart showing specific volume of steel as a function of temperature and carbon content. A reciprocal of these figures should give you density data. Another possible source would be the book "The Metal Iron," of the same Alloys of Iron series which gives, on p. 272, density figures for iron at various temperatures. The Alloys of Iron series is published by the American Institute of Mining and Metallurgical Engineers, 29 W. 39th St., New York.—Ed.

MAGNESIUM ALLOY SHEETS

Sir:

In the May 10, 1945 issue there appeared an article entitled "Deep Drawing Magnesium Alloy Sheets" by Messrs. L. J. Weber and H. Vanden Berg. Can you furnish us with tear sheets of this article suitable for reproduction by photo offset?

J. J. MALONEY
Aluminum Co. of America,
Pittsburgh

● Two tear sheets of this article have been forwarded.—Ed.

METRIC vs. ENGLISH UNITS

Sir:

The writer is gathering material for a technical treatise concerning the relative magnitudes of engineering quantities. An important part of this concerns the relative merits of the metric system and the present American arrangement in which both the metric and English systems are legal. The writer's present opinion is that the system now in use is reasonably satisfactory and that there should be no vigorous attempt to change matters. However, I have an open mind on the subject . . . and would appreciate a few brief comments from you on the subject.

J. F. DREYER, JR.
29-28 41st Ave.,
Long Island City, N. Y.

● The controversy of metric vs. the English system has been raging on and off for the past 30 yr and reference to technical journals of 30 yr ago will show that present day arguments are just about the same now as then. The census of practical opinion seems to be that the change would necessitate too great an industrial investment. We would not only have to change all our drawings and plans which are in the English standard, but also tools, dies and gages. Certainly the metric system would simplify calculations, especially for our school boys, who then have to juggle decimals instead of fractions. There are, of course, a dozen other arguments one could marshal on both sides of the question, but the magnitude of the cost of such a change is probably the primary factor militating against it.—Ed.

BARNESDRIL SEPARATOR

Sir:

We would appreciate your advising us the address of the manufacturer of the Barnesdril Separator shown in Feb. 28 issue in the article "Clean Coolant Aids Honing" by William Baumbeck.

L. JAGENDORF,
Purchasing Agent
Norwalk Lock Co.,
S. Norwalk, Conn.

● The Barnes Drill Co., 824-34 Chestnut St., Rockford, Ill.—Ed.

CARBON DETERMINATION

Sir:

We are looking for the following article which appeared in your magazine: "Combustion Train for Carbon Determination," by J. B. Stetser. This article is said by the Fisher company of Pittsburgh as having appeared in your Vol. 120, No. 8. We could not find it there and would appreciate very much your indicating to us the number in which we can find the article.

R. LAURET,
Manager
Touzart & Matignon,
Paris

● A thorough search of our files of Vol. 120, No. 8 (Aug. 25, 1927), fails to reveal any information on the item you mention. Further, we've searched our indexes both before and after that date and still can't find reference to Mr. Stetser's article. Perhaps if you let us have the original source of your data we might be able to run it down. Does any reader recognize this reference?—Ed.

SOURCE OF OILLESS BEARING

Sir:

We want to get a small number of oilless bearings. I understand such things are made out of pulverized metal and compressed together. After they are made, they are saturated with oil or grease, which makes them last for a long time. The sizes we are interested in are somewhere around from ⅛ in. to ¾ in. bore. Outside diameter of no special importance. I suppose the length would be probably twice the inside bore.

W. WALLACE McKAIG
Cumberland Steel Co.,
Cumberland, Md.

● We would suggest that you contact the following companies: Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.; Johnson Bronze Co., Newcastle, Pa.; and Moraine Products Div. of General Motors, Dayton. —Ed.

JOB EVALUATION

Sir:

I am enclosing my check for $2.40. Please send me four reprints of the article "Common Sense in Job Evaluation" and the three other previous articles included.

JOHN ROWE
Staff Industrial Engineer
Container Co.,
Div. of Continental Can Co.,
Van Wert, Ohio

PRECISION CASTING

Sir:

Recently in an article in THE IRON AGE reference is made to a substitute of a plastic material in place of the wax now used in precision castings. We would appreciate the name of the plastic used and also the companies manufacturing same.

T. M. NOLAN,
Quality Manager
Bell Aircraft Corp., Ordnance Div.,
Burlington, Vt.

● The use of plastic in place of wax for precision casting operations was discussed in the article "Precision Casting with Plastic Patterns," Nov. 15, 1945. Sources of the polystyrene used for this purpose are Bakelite Corp., Dow Chemical Co., Monsanto Chemical Co., Union Carbide & Carbon Corp., and American Phenolic Corp.—Ed.

T and W experience... and YOURS

No one knows better than the manufacturer who uses them certain requirements which deep drawn stampings must meet. His own operating experience is the one most authoritative source of this knowledge. So, too, does extensive experience on the part of the stamping producer afford related knowledge of prime importance in determining the best solution to manufacturers' parts needs. It is for the value of this combined experience that so many of the nation's large users have brought their stamping requirements to Transue. It costs you nothing to consult with a T & W engineer.

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DESIGNERS AND MAKERS OF DEEP DRAWN STAMPINGS

This Industrial Week . . .

- **Reconversion Dealt Severe Blow Again**
- **Freight Embargo to Hit Steel Users**
- **Steel Ingot Rate Drops to 59 Pct**

THE coal strike has so accentuated and added to the bad effects of the steel strike that manufacturers' inventories have become so unbalanced that it will take months to get smooth production even after the coal controversy is settled. In its sixth week and with the probability that it will not be settled before June, the coal strike has seriously held back production of urgently needed refrigerators, household appliances, building materials, automobiles and a whole list of items needed for reconversion from war scarcities.

The inflationary effect of both the steel and coal strikes is fully realized by THE IRON AGE statistics which indicate that by the end of next week more than 10,000,000 tons of steel ingots will have been eliminated from the market since the first of the year because of these two stoppages.

Steel ingot output this week is down 9.5 points to 59 pct of rated capacity from last week's rate of 68 pct. Indications are that the rate will drop at least 10 points next week unless the coal strike is immediately settled, a move which is looked for by no one. Even after the mine impasse has been eliminated, the steel industry will need at least two weeks or more to climb from its low operating rate.

A survey of the various districts in which the steel operating rate in the week before the coal strike is compared with the rate this week shows the following: Pittsburgh, 100 pct, down to 57 pct, a loss of 43 points; Chicago, 91.5 pct to 54.5 pct, down 37 points; Youngstown, 82.5 to 45.5, down 37 points; Philadelphia, 91.5 to 55, down 36.5 points; Cleveland, 94 to 85, down 9 points; Buffalo, 99 to 78, down 21; Wheeling, 94 to 71, down 23; South, 95 to 46, down 49; Detroit, 95 to 98.5, up 3.5 points; West, 62 to 49, down 13; Cincinnati, 90 to 73, down 17; St. Louis, 71.5 to 59, down 12.5; East, 113 to 84, down 29; and the total for the country, 89.5 to 59, down 30.5 points.

THE steel loss during the first three weeks of the coal strike was mostly attributed to shutdowns in plants of the U. S. Steel Corp., but within the past two weeks other companies whose coal supply is running low have been forced to curtail operations with more drastic shutdowns slated at those plants for next week.

The effects of the coal strike are being particularly felt in Illinois and Indiana where power consumption is being restricted to 24 hr per week. Two steel plants which depend on purchased power discontinued steelmaking and rolling operations altogether this week and a third made a sharp cut in finishing operations. Some manufacturing plants there tossed in the sponge and declared an enforced vacation for their employees, while others worked one shift for the first three days of the week.

Manufacturing concerns which have been fortunate to keep their wheels going so far were to be curtailed this week by the freight embargo brought on as a direct result of the coal strike. Incoming shipments to industrial plants are being limited to material which can be moved by truck. Lack of storage space in many cases will halt operations soon. At least one major steel producer on the Great Lakes will inaugurate a program of heavy water shipments to consuming centers in the Lakes region.

CIVILIAN Production Administration officials told steel industry representatives last week of mounting shortages in a long list of items including bale ties, wire rods, wire products, reinforcing steel, light gage sheets, galvanized sheets and railroad specialties. Small nonintegrated steel producers who buy finished steel for further processing have been particularly hard hit.

The nicely-laid plans of the OPA to readjust upward the prices on some low-return items in order to increase their production blew up last week with the result that for the time being the only upward adjustment which will be made is slated for alloy steels. These will be advanced approximately 3 pct over and above the 4 pct raise which they were recently granted. The steel price problem, however, is still active and steel companies are expected to keep OPA supplied with arguments as to why certain steel products should be advanced.

In one of the largest freight orders placed in recent weeks Southern Railway ordered 2000 cars as follows: 1000 box cars to Pullman-Standard Car Mfg. Co.; 600 gondolas to Pressed Steel Car Co., Inc.; 270 ballast cars to American Car & Foundry, and 150 covered hopper cars to Harlan & Hollingsworth.

THE scrap situation throughout the country is becoming tighter than at any time since the war ended. The coal strike has not lessened the demand as many steel mills were using scrap to make up for the shortage in pig iron. Now that the embargo will stop scrap shipments the end of the coal controversy will find the nation's steel mills scrambling for scrap in all directions. In recent weeks springboards have been paid on good heavy melting, low phos scrap and all types of cast scrap.

Many foundries have been hard hit by both the steel strike and the coal strike. In the first case the shortage of pig iron was caused and in the second case not only was pig iron in tighter supply but lack of coke forced many plants down. More serious has been the decision of some merchant pig iron furnaces to shut down until a better price for pig iron is obtained. These firms claim that to continue operations means a continuous loss.

• **HOUSING PROGRAM THREATENED**—A currently indicated shortage of 230,000 tons of wire nails for 1946 is seen in Washington as a serious threat not only to the housing program but to the crate supply for shipment of certain types of perishable foods. Other shortages seen as affecting the housing program exist in the cast iron soil pipe and plumbing supply industries. Sheet steel, pig iron and coke shortages are retarding plumbing supplies. Bathtub production (about 80 pct cast iron) is expected to fall short of 1946 requirements of 1,350,000 units by 300,000; lavatories (45 pct iron and steel), 445,000 units short of the needed 2,115,000; and sinks (75 pct iron and steel), 900,000 units less than the required 2,300,000.

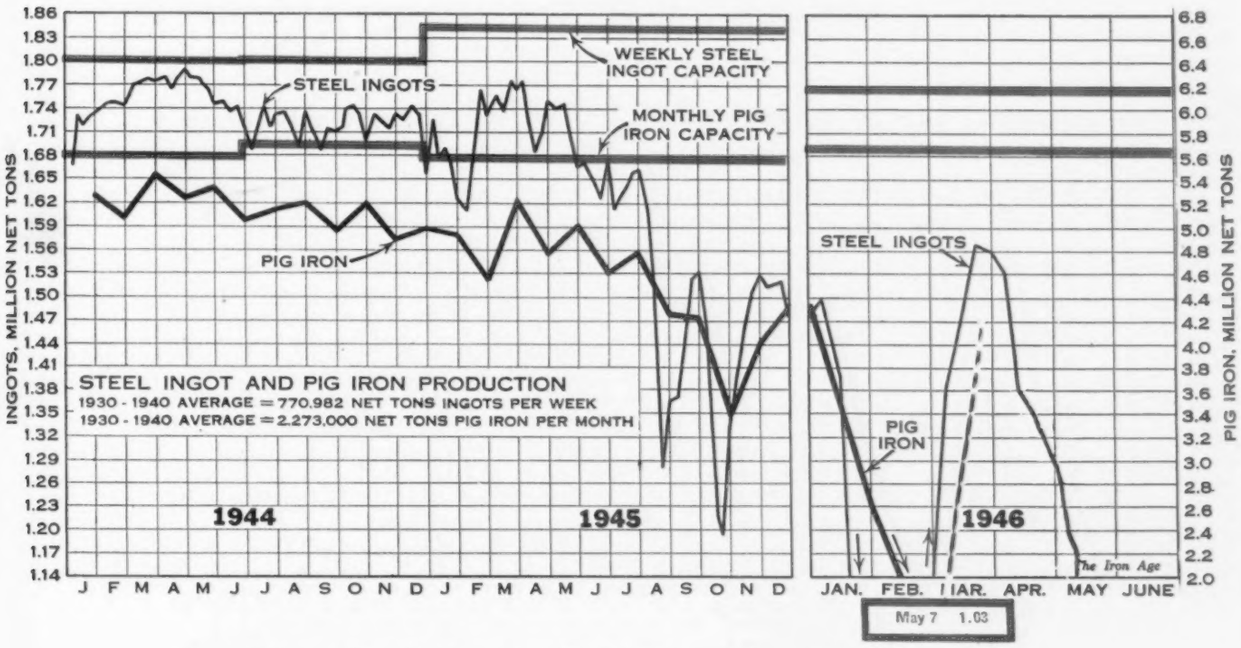
• **SHEETS**—Depending upon the method of handling sheet bookings, mills are either on a current booking basis with a 45 to 60 day lead time and comparable deliveries, or they are booked completely through the year. In any case, more orders are being refused than accepted. Flat-rolled products are being favored over other items as to steel availability, so that the coal strike has not yet hit flat-rolled production. Shortages in lighter than 24 gage material can be attributed to this material going into tinplate. Some cramping of production of heavier gages is traceable to the utilization of annealing and pickling facilities in production of sheet for tinplate.

• **ALLOY STEELS**—While producers were waiting for OPA to announce price increases on alloy steels, the supply situation on alloy steel products was relatively easy. There are some tight spots, especially in small sizes in bars and in specific sheet gages. On the whole the alloy steel availability is far better than that of carbon steels. Producers are carefully scanning orders so that customers do not substitute alloy steels in applications where carbon steels would normally be used. Tool and die steel orders have dropped off somewhat, with deliveries running between five and six weeks.

• **CONCRETE BARS**—New bookings are reflecting the coal strike just as they did the steel strike. February bookings fell off about one third from January, and April new orders will likewise be substantially lower than those of March. Concrete bar orders currently hunting a producer run well over 100,000 tons.

• **TINPLATE PRODUCTION HIT**—Although producers agreed to treat tinplate production as a sacred cow in response to Civilian Production Administration request, schedules were cut this week at several plants because of shortage of blast furnace or coke oven gas. Until this week, production had been kept at a high level because of the vital need for the food packing industry. Plants using their own gas, however, have been forced to cut with declining coke oven and blast furnace operation. In the Chicago district, the order restricting power usage tied another shackle on operations.

• **PLATE MILLS JAMMED**—With few exceptions, mill schedules on plates are filled for the balance of the year. Demand is extremely heavy for universal mill plates, as well as for sheared. Reconversion of continuous mills to lighter gage products, and obvious reluctance to schedule less profitable plate rollings against ingot capacity, has bumped into the face of heavy demand, from the utilities, the petroleum industry, and heavy manufacturing requirements.



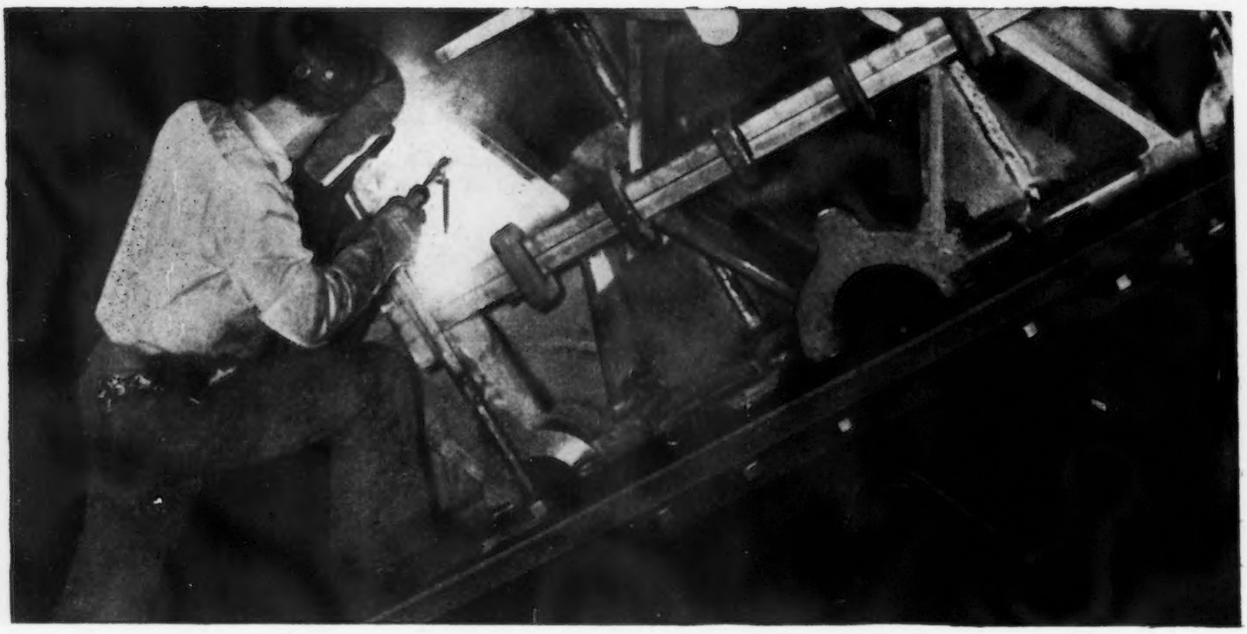
Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 30.....	60.0	68.0	61.5	75.0	88.0	82.5*	77.0	63.0	98.0	54.0	69.0	65.0	88.0	68.0*
May 7.....	57.0	54.5	45.5	55.0	85.0	78.0	71.0	46.0	98.0	49.0	73.0	59.0	84.0	59.0

* Revised

MUREX FHP

"Hot" Electrodes



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MUREX ELECTRODES

Steel Group Rejects Increases on Low Profit Items

Washington

By GENE HARDY

o o o

• • • **Alloy steel prices** will be upped approximately 3 pct, in addition to the 4 pct previously authorized, THE IRON AGE learned this week. OPA confirmation is expected within a few days.

At the same time, OPA sources indicated that there is little likelihood of a price increase on the so-called low profit products, although this problem is still receiving active consideration in Washington.

The additional increase in alloy prices dates back to the original directive from Reconversion Director John W. Snyder which permitted the recent $5 a ton boost. At that time OPA was directed to grant increases to both stainless and alloy steels, despite the fact that price controls on stainless steel had been dropped on Nov. 11, 1945.

The amount of the increase originally allocated to stainless steel, which came out of the overall alloy allocation, will now be applied entirely to alloy steel. It represents a shift of about $5 million from stainless to alloy steel in OPA price schedules.

In regard to price increases for many steel items which are in small production or have been eliminated from mill schedules, OPA says that the General Steel Products Advisory Committee on May 1 approved a resolution which indicates that price increases would not solve this problem.

The resolution said, in effect, that the Committee does not believe it wise to raise prices on the non-profit items as an incentive to production, as this would work to the detriment of other items as well as the overall production rate.

The Committee expressed the opinion that the problem which now confronts the industry is one that will be solved only when maximum output has been reached and that it cannot be solved by price action.

Along these lines, OPA takes the position that it is practically impossible to correct all shortages by means of price increases. Further, OPA says that the price agency cannot guarantee a profit on all items on which there was previously little or no profit. Finally, production problems lie within the province of CPA.

Coal Strike Seen Paralyzing Midwestern Industries

Chicago

• • • **Power consumption** regulations limiting industrial operations in most of Indiana and Illinois to 24 hr per week were expected to starve most manufacturing and some steelmaking operations in those states to a skeleton by the end of this week. The prospective freight embargo May 10 is likely to make them a cadaver.

The compulsory power diet allows the 24-hr operation to be divided according to the choice of the individual user instead of between the hours of 8 a.m. and 12 noon as originally proposed. Most industrial power consumers, however, scheduled three 8-hr working days for the first part of the week with the faint hope that regulations would be later modified. With the exception of Carnegie-Illinois Steel Corp., which was slated to shut down its electric furnace operations at South Works, Chicago, most electric furnace operators were planning to run three 8-hr turns, tapping one or two large heats during each, and keep the furnaces under heat with gas in the interim period. Republic Steel Corp., at South Chicago, which had been refused an exception from the power order, shut down all steelmaking and finishing operations. Youngstown Sheet & Tube Co. closed down its lapweld pipe and merchant bar mills at East Chicago, Ind., May 4 for lack of purchased power. The Wisconsin Steel Works of International Harvester Co., at South Chicago, discontinued steel making and finishing for the same reason.

Manufacturing operations, almost without exception, were planning 8-hr shifts for each of the first three days of the week.

Aside from the production implications, the order had labor and power rate ramifications. Workers facing loss of pay during the idle period were counting their prospective paychecks carefully, offsetting them against potential unemployment compensation if the power order is enforced for a long period. Many were planning to work the three days, then file for unemployment benefits because of the compulsory layoff. Power consumers, particularly those using heavy loads, such as required for electric furnace operation, were attempting to determine their status in obtaining relief from the high power rates involved under contract during the operating period.

Some plants, such as farm equipment producers, hoped for a liberal classification of essentiality, allowing continued full-scale output, but initial classifications gave them little hope. International Harvester Co., just recovering from a three months' strike, was faced with restriction unless relief could be obtained.

Despite their escape from regulation, most firms with their own power plants had dwindling coal inventories, making curtailment inevitable within 3 to 4 weeks, with few exceptions, unless inventories were replenished by the end of the strike in the meantime.

The Joliet and Waukegan plants

of American Steel & Wire Co., already crippled for semifinished material because of the coal strike, read the power order as a death notice, and closed May 4 for an indefinite period. Employees were notified that the initial portion of the shutdown would be considered as a vacation period under their contract. The Chicago Heights plant of Inland Steel Co. was shut down May 3 midnight.

The freight embargo on virtually all shipments except food and fuel, covering coal burning trains, is expected to be a coup de grace for all manufacturing operations. The order virtually cuts off incoming material shipments, restricting the operating period to the extent that inventories are on hand, and limiting production to what can be stored at the plant. Few plants have either extensive inventories or storage space. Because of the high integration of freight shipments, continued operation of trains burning other fuels than coal is expected to provide little practical relief.

Power companies were swamped following issuance of the order with requests for interpretations and exemptions, but, although maintaining a tolerant attitude, were wary of letting even a trickle of power through the regulatory dike.

Chicago office buildings and stores, limited to power usage between hours of 2 p.m. and 6 p.m., were thrown into total confusion by the order. Most stayed open, however, with candles and kerosene lamps in evidence.

Youngstown Expansion Tops $3 Million in '45

Youngstown

• • • **The Youngstown Sheet & Tube Co.** spent $3,776,345 in expansion last year. The money was spent to provide new equipment, plant extensions and general company improvements during the year. The company's main expansions were begun late in the year, some of them after the Japanese surrender.

At Indiana Harbor one of the major investments was for eight diesel locomotives, each of 100-ton capacity. In addition to these, various items of equipment were added to the blooming, billet and merchant mills.

The major project—an addition to the cold-rolling mill at Campbell—was not announced until September. The building is nearing completion and part of it is in use. Improvements at Campbell also included a new iron foundry and new equipment in the seamless tube mill.

At the Nemacolin, Pa., coal properties, new mechanical equipment was installed. This included a new cutting machine to cut through the vein of coal, and a new loading machine to load the coal into cars.

At the Newport iron ore mine additional work was done on the shaft being sunk to reach additional iron ore.

Some of the money was invested for equipment which is being manufactured but has not yet been delivered. Included in this is new wire drawing equipment for the rod and wire department at Struthers.

Projects estimated to cost $3,640,000 have been approved by company directors and these improvements will be made as soon as materials can be obtained. Included in this program are additional equipment for the cold reducing mill, completion of the rebuilding of two ore bridges and installation of the wire drawing facilities in the Youngstown district.

Work at Indiana Harbor will include changes to the two-stand temper mill at the cold reduction strip mill.

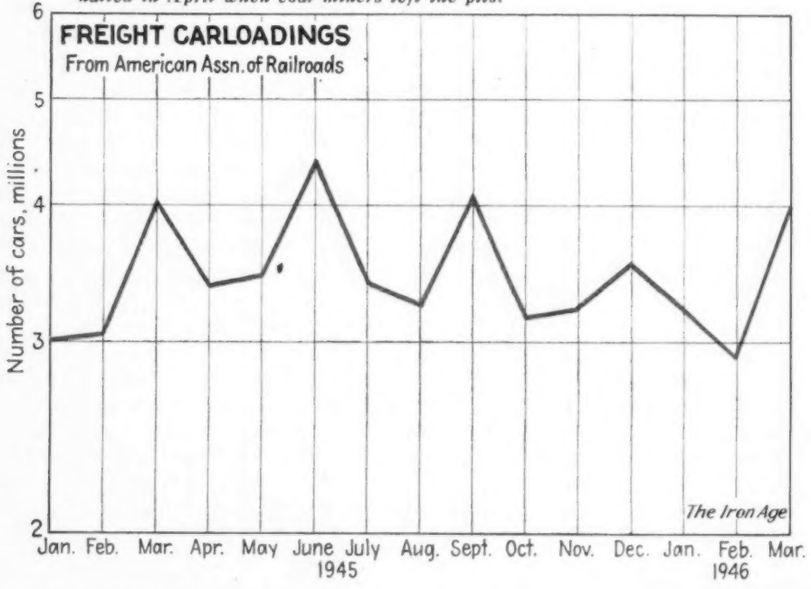
Inland Speeds Expansion

Chicago

• • • **Inland Steel Co.'s** $12 million addition to its Indiana Harbor, Ind., plant, which will nearly double its cold-rolled sheet capacity, will be carried out without purchase of additional heavy rolling equipment.

Greatly speeded production on existing equipment will be made possible through the addition of 550,000 sq ft of floor space in which the present Skin Pass mills and accessory operations will be housed. Some old annealing equipment will be retired and a new normalizing furnace added. New shears will be installed, and substantial revisions made in electrical equipment. Facilities for production of hot rolled pickled and oiled sheets will be expanded, and pickling lines completely rebuilt. A portion of the space will be devoted to shipping facilities.

ECONOMIC BAROMETER: *Freight carloadings, always a reliable indicator of industrial activity, dipped after V-J Day but seemed to regain momentum when interrupted by major strikes. The upward trend in March was again halted in April when coal miners left the pits.*



Republic Will Expand Tinplate and Silicon Steel Output in Ohio

Warren, Ohio

• • • **Production of electrolytic** tinplate and silicon strip steel in the Mahoning Valley will be materially increased as a result of an engineering and construction program now underway at Republic Steel Corp. plants in Warren and Niles.

Frank E. Flynn, manager of Republic's Warren District, which includes Niles, said the program, one phase of which is aimed at increasing the annealing capacity of the district, will entail construction of two buildings, one at Warren and one at Niles, installation of new equipment, including annealing furnaces, gas machines and handling facilities as well as modification of present equipment to speed up certain processes.

First step to increase the capacity of the tin mill at Niles will be through use of larger coils. At the present time, steel to be made into tinplate at the Niles mill is processed from coils 28 in. wide. As a result of the engineering and construction program, three of these coils will be butt welded together into coils having an outside diam of 52 in. and weighing up to 15,000 lb. Handling equipment throughout the entire plant will be heavied up and uncoilers and recoilers will be rebuilt to handle the larger, heavier coils.

Mr. Flynn estimated capacity would be increased from 20,600 to 23,700 tons per month at the continuous pickler where the butt welding equipment will be installed. Operation of the Tandem Cold Reducing Mill will be speeded up to handle the increased output thus obtained.

Four portable annealing furnaces, two of the standard practice and two ultra-modern type furnaces will be installed, providing an additional annealing capacity at the Niles plant of 9000 tons per month, or approximately double the present capacity.

Three gas machines will also be installed to furnish atmospheric gas in connection with the annealing process. A heavy type building, 115 by 220 ft, will be built for the new annealing furnace. The building will include a 60-ton overhead crane.

Extensive modification and redesign of the Unitemper mill will be made to speed up its operation to the increased production resulting from the larger coils and to eliminate delays now encountered in the changing of rolls. This mill, only one of its type in the world, was developed jointly by Republic and United Engineering Foundry Co. and was placed in operation in the summer of 1942.

Resembling a regular 4-high rolling mill in appearance, the Unitemper is actually a 2-stand, 2-high mill, one stand above the other. Strip steel is threaded between the top rolls and downward diagonally to the lower mill, thence through the bottom rolls. The lower stand is operating at a greater speed than the upper, tempering the annealed steel by stretching the strip as it passes between the two.

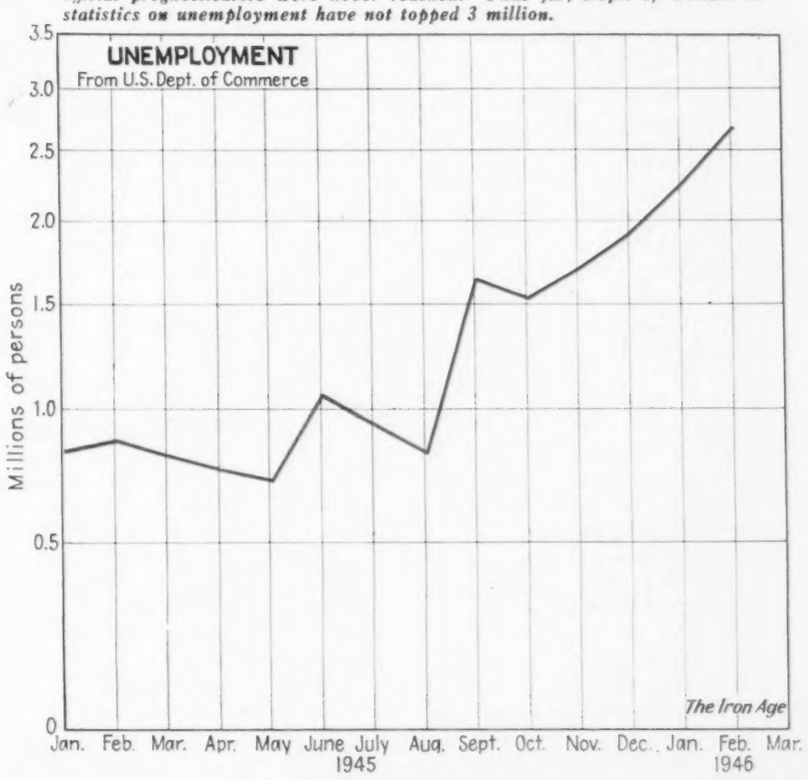
At the Warren plant, improvements will be made in the hot dipped process. The project calls for modernizing six hot-dip tin pots.

Another phase of the program at Warren will be rebuilding and modernizing 32 annealing furnaces in the cold-strip department, gaining about 7000 tons per month. These furnaces will be rebuilt in groups of five or fewer in order to keep interference with current production at a minimum.

Production of silicon strip will be increased by the installation of seven radiant tube annealing furnaces and all necessary handling facilities. The annealing capacity of the silicon strip department will thus be doubled. The silicon annealing furnaces will necessitate construction of a new building 100x454 ft of a light factory type construction. Six of the furnaces will be contained in this building.

Mr. Flynn said engineering on the entire program had been completed and that orders had been placed for necessary equipment and contracts let on construction. Completion dates on the various phases of the program, according to the present schedule, he said, run from Sept. 1, 1946, to August 1947.

MOUNTAINOUS WAVE OR RIPPLE? *While obviously the number of unemployed has increased sharply since the war's end, the murky estimates of official prognosticators were never reached. Thus far, Dept. of Commerce statistics on unemployment have not topped 3 million.*



U. S. Steel Given Good Chance to Get Geneva Steel Works

Washington

• • • **Because of conditions** imposed by most bidders for the Geneva, Utah, and South Chicago government-owned steel plants, it is believed here that U. S. Steel and Republic Steel hold the edge in chances to acquire these respective plants. This, of course, is contingent upon whether the Dept. of Justice offers objections to such acquisition on the grounds of conflict with antimonopoly statutes.

See p. 96 for additional news of Geneva Steel Works.

No decisions will be reached or awards made for at least 30 days, War Assets Administration officials said, because these same complicated conditions make most of the bids difficult to analyze and compare. Seven proposals were received for the Geneva property and two for the Chicago property when bids were opened on May 1.

It is not generally believed that Justice will interpose serious objection to either bid in the event the proposals should be accepted by WAA, despite the Department's opposition to further expansion of U. S. Steel. This belief is based upon the great interest shown by western people and their Congressmen in maintaining western steel production.

Gov. Herbert B. Maw, Sen. Abe Murdock, Rep. J. W. Robinson, all of Utah, and other westerners were present at the opening and listened attentively to reading of the bids. Reflecting a general sentiment in that state, all three are said to be desirous that the Geneva plant be sold to the Steel Corp., both because of its experience in operating the plant and its financial responsibility. They are also reported to be sympathetic to the Steel Corp. acquisition because they feel that it would assure continued operation of the plant.

U. S. Steel, through its western subsidiary, Columbia Steel, offered $40 million for the Geneva plant—original investment valued at $202 million—plus $7.5 million for inventories. It reserved the right to withdraw the bid if it were not accepted by June 15. Benjamin

By KARL RANNELLS

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F. Fairless, who signed the bid, said that if successful his firm would spend not less than $18.6 million for additional peacetime production facilities to bring hot-rolled coil output to 385,000 tons.

Another $25 million would be spent for a new plant to be erected at Pittsburg, Calif., to convert these coils to cold-reduced sheets and tinplate. This would bring U. S. Steel's total investment to $91.1 million, none of which would be asked of the government. In contrast, most other bids asked federal assistance in financing conversion and additional facilities.

Discussing its pricing policy, President Fairless said that for all products produced at the Geneva plant, and which will be sold to the public on a basing point method of selling, a basing point will be established at Geneva.

"The pricing policies which will be followed with respect to the sale of products to the public from the Geneva plant will be the same as the pricing policies generally followed by the various steel producing subsidiaries of U. S. Steel," the bid said.

"These policies would involve the sale of products produced at Geneva to customers at the lowest price consistent with a reasonable return to stockholders. In the active markets for steel on the Pacific Coast, Columbia Steel has always endeavored to price its products competitively and proposes to do so in the future."

Profitable operation of the Geneva plant, the bid stated, was dependent to a large degree upon a reduction of freight rates to the coast. It was made clear, however, that the U. S. Steel bid was not contingent upon this factor.

Republic, presently the lessee of the South Chicago plant, offered to lease the property for five additional years with option to renew for either 5 or 13 yr and privilege of outright interim purchase at a predetermined price. It involved a detailed production scale of rental payments based on a wide variety of steel products, but guaranteed a minimum rental of $200,000.

Needed conversion of this plant would be done by Republic at its own expense. This would include substitution of a number of open-hearth furnaces for the present electric furnaces which would be stored against emergency requirement.

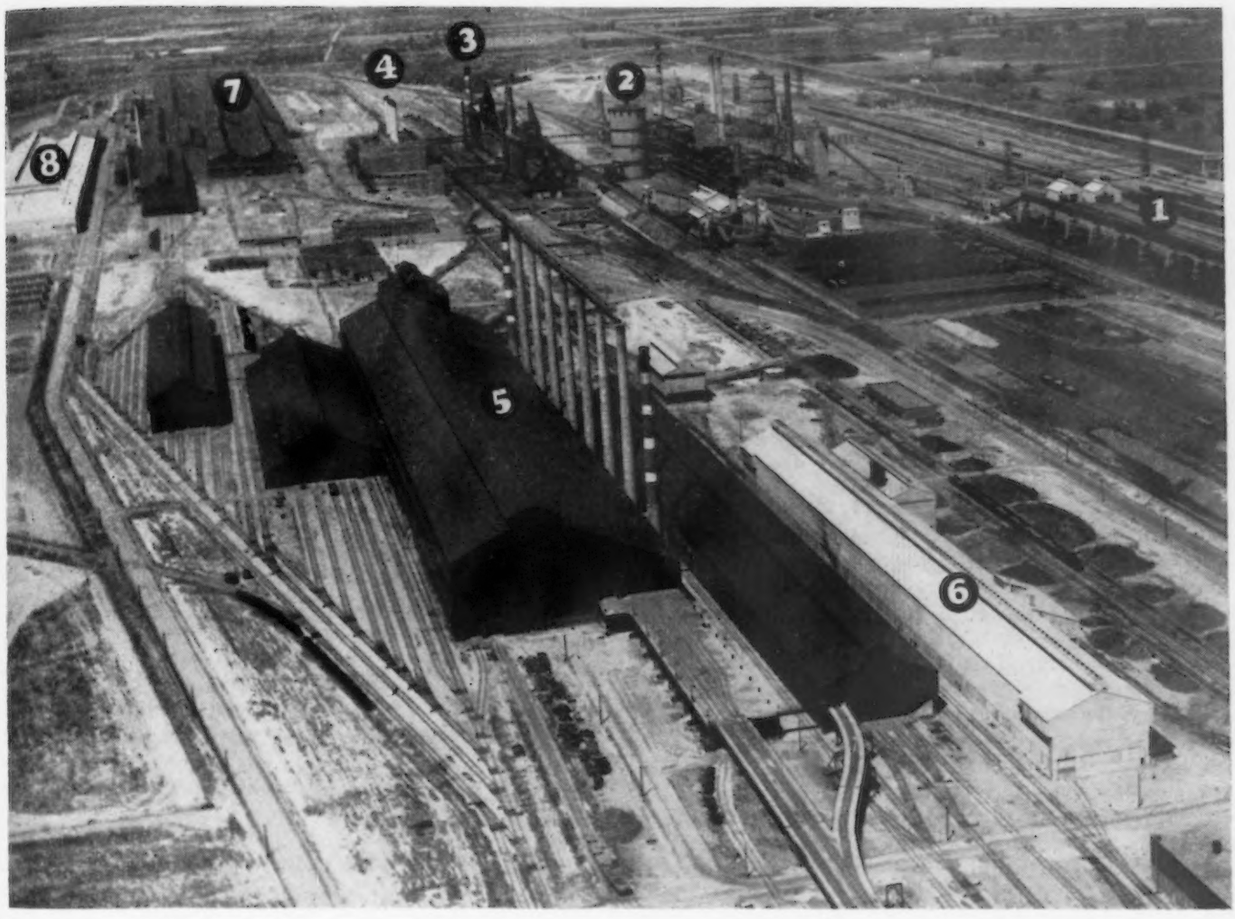
The only other bid for the Chicago property was by the Central Steel Tube Co., Clinton, Iowa, which offered a flat sum of $17.5 million, to be paid within 2 yr by a corporation yet to be established.

Pacific American Steel offered 20 pct of the valuation of $202 million, for the Geneva plant, payable over 20 yr. It advised the WAA in conjunction with its bid that the plant should not be sold to easterners "because of their peculiar ability to make a failure of every operation in the West."

Other Geneva bidders included Colorado Fuel & Iron Corp., Denver, a lease with rental of $2 per ton of production, estimated at 500,000 tons; Riley Steel Co. of Los Angeles which offered approximately $222 million (including interest) with a down and annual payments of $12.3 million; J. S. Warshaw, industrial consultant of New York City, who offered two-thirds its "as is" value, 50 pct down and the balance in 20 payments free of interest; Assets Reconstruction Corp. of Los Angeles, "as is," $38,750,000; and the Blue Star Enterprises, Inc. of Salt Lake City, a bid of $302 million, later withdrawn as "a mistake."

Kaiser Co. of Oakland, Calif., which had long been interested in both plants, particularly in the South Chicago plant, did not bid on either property. Instead Henry J. Kaiser sent a letter of explanation in each instance.

He declared that his Fontana, Calif., plant is now competitive but the fixed charges on the RFC loan may well destroy this. He demanded that debt charges on Fontana be reduced in adjustment with whatever funding arrangements might be made for Geneva.



GOVERNMENT PAWN: *Here is an aerial view of Geneva Steel Works upon which volumes of words have been written. It shows* (1) *coal, iron ore and limestone;* (2) *the byproducts coke ovens;* (3) *blast furnaces;* (4) *power plant;* (5) *openhearth furnaces;* (6) *foundry;* (7) *plate mill;* (8) *structural mill. (Aerial photo by Ray G. Jones, staff photographer for* The Deseret News.)

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In effect, his claim was that the fixed charges prevented his bidding on Geneva.

Kaiser's failure to bid on the Geneva property was not unexpected in steel circles. However, he was known to be definitely interested in the South Chicago plant. His letter in this case explained that since it was built for production of heavy munitions and aircraft steel, it would not be suitable for his purposes—the making of housing and transportation products.

The steel plant at Geneva, built and operated by U. S. Steel, cost the government approximately $190,000,000. It was built for mass production of plates and structural shapes for the West Coast shipyards and also for the production of shell steel.

The major facilities of this plant include a sintering plant, a coke plant, three 1200-ton blast furnaces, nine 223-ton openhearth furnaces, a 45-in. blooming and slab mill, a 132-in. semi-continuous plate mill, a 32 x 26-in. structural mill. The blast furnaces have an annual capacity of 1,150,000 net tons of pig iron and the openhearth furnaces have an annual capacity of 1,283,400 net tons of ingots. This plant can produce 250,000 net tons of structural shapes and 700,000 net tons of sheared plates per yr.

The South Chicago Plant, built and operated by Republic, cost approximately $90,000,000. It was built specifically for increasing the production of high quality electric furnace alloy steel, principally for aircraft production as well as rolled gun blooms for gun forgings. The facilities include a byproduct coke plant, sintering plant, one 1275-ton blast furnace. four 200-ton openhearth furnaces, nine 70-ton electric furnaces, of which six have been deferred but are practically completed, 44-in. blooming mill, 36 x 32-in. bar mill and service facilities.

The blast furnace has a capacity of 450,000 net tons of pig iron per year. The openhearth furnaces have a capacity of 571,000 net tons of ingots per yr. The nine electric furnaces have a capacity of 750,000 net tons of ingots per yr. The openhearth furnaces and electric furnaces are designed for independent or duplexing operation and their capacities are dependent on the type of operation. This plant can produce 480,000 net tons of heavy bars per yr.

Price Rise in Gray Iron Castings Designed To Correct Disparities

Washington

• • • **Effective May 3,** OPA has announced increases in ceiling prices for gray iron castings of varying percentages dependent upon periods in which the current price levels were fixed. Similar action was taken recently with respect to malleable iron castings, whose price increases became effective Apr. 26, though the percentages of increases for the two grades of castings were not identical.

The following percentage increases were granted producers of gray iron castings:

(1) Gray iron castings with maximum prices frozen at levels in effect during the base period, Aug. 1, 1941 to Feb. 1, 1942—28 pct. At the same time, OPA revoked a previous 10 pct increase in base period maximum prices so the 28 pct increase must be taken on the maximum prices prior to the 10 pct increase.

(2) Gray iron castings with maximum prices computed by a seller's pricing formula between Oct. 26, 1942 and Dec. 31, 1943—12 pct.

(3) Gray iron castings with maximum prices computed between Jan. 1, 1944 and Dec. 31, 1944, and for castings for which sellers have elected to use their pre-base period prices—6 pct.

Ceiling price increases, OPA said, are aimed at removing disparities in base period prices and those fixed by formula during various periods. Previously, ceiling prices varied so greatly that the output of castings with base period or early formulated price ceilings was reduced substantially. The varying increases provided by this action are designed to correct inequities which are interfering with the flow of production.

CC Ratings Granted Mines

Washington

• • • **Priorities assistance** to obtain construction machinery has been made available by CPA to coal mining companies where the procurement of such equipment will materially increase production of certain needed types of coal in areas east of the Mississippi River. Through an amendment to Schedule 1 of PR 28 coal mining companies may apply for CC ratings to obtain construction machinery to be used in underground coal mining if such equipment would increase the production of high-grade metallurgical, double screened domestic and anthracite coal in the areas defined in Schedule 1 to PR 28.

CPA Earmarks Surplus Wire for Bale Tie Use

Washington

• • • **CPA has earmarked** 7500 tons of wire in government surplus property for the manufacture of bale ties. This action was taken, it was stated, because of the shortage of these ties.

The tonnage was earmarked through the issuance of Direction 17 to PR 13 and consists of carbon black annealed or galvanized wire in 12 through 16 gages inclusive. However, 15 pct of any lot merchandised by WAA may be sold to buyers other than manufacturers of bale ties.

The direction only applies to black annealed or galvanized wire which is declared surplus in Iowa, Minnesota, Missouri or states east of the Mississippi.

Under Direction 17, a purchaser of wire from surplus property to be manufactured into bale ties must certify that he is a producer of wire bale ties and that the material obtained under the purchase order will be used only for the production of bale ties suitable for use in baling hay, straw, alfalfa, other farm products, paper and rags.

May Acquire Homestead

Washington

• • • **Steps have been** taken by the Carnegie-Illinois Steel Corp. to acquire the government-owned portion of its Homestead, Pa., steel works, it was said here. No final action can be taken by WAA, however, until after the property has been advertised for sale and the proposed acceptance approved by the Dept. of Justice as not in conflict with anti-trust laws. If the amount involved is more than $1 million the Surplus Property Act requires review by the department.

Ed. note: Negotiations in both these plants are well along and announcements are expected soon.

At the same time, it was learned that negotiations are about to be completed by which approximately 75 pct of the government-owned equipment of the Gary, Ind., plant of National Tube Co. will be purchased by the company, wartime operator and lessee.

Inasmuch as no land or plant is involved in the National Tube transaction Reg. 6 permits the RFC to make direct sale of the equipment to the lessee. The remainder of the equipment will be declared surplus to WAA for disposal as surplus.

FTC Studies Mergers In American Industry

Washington

• • • **The Federal Trade Commission** has been making a study of consolidations and mergers within American industry and expects to have a report on the subject available by midsummer.

This study accounts for requests for information that have been received by various companies, including several in the steel industry. FTC did not establish a questionnaire to cover all firms, but covered the case of each company in an individual letter covering the specific situation in that firm. Only companies that have acquired or have merged with going concerns are covered in the study.

FTC is interested in the reasons surrounding the consolidation or merger and other such factors to determine the effects of concentration on the American economy.

Resellers Get 7 Pct Rise

Washington

• • • **Resellers of bolts,** nuts, screws and rivets may pass along the 7 pct increases granted producers of these products Apr. 1, 1946, OPA announced on May 6.

Maximum prices for these products have been increased 7 pct when they have been customarily sold by the reseller on a list or discount basis. When sold on any basis other than list and discount, the reseller may increase his prices the dollar-and-cent amount by which his suppliers' ceilings have been increased.

Canadian Aluminum Price Cut May Capture World Market

Montreal

• • • **A reduction in the** price of virgin ingot aluminum to 13¼¢ per lb delivered anywhere in Canada has been announced by the Aluminum Co. of Canada, Ltd. Converted into U. S. currency at the present rate of 90.9, the price is 12.04¢ per lb for aluminum of 99.5 pct purity.

This price is not competitive with domestic production due to the tariff of 3¢ per lb which equalizes it with the U. S. price, but the latter includes delivery to any point in the country. According to officials of the company, the new price does not contemplate promotional activities in the U. S. in competition with domestic producers.

In foreign markets, however, the new low price is more than likely to permit the Canadian producer to dominate the field. The new price is based on the recent contract to supply the United Kingdom with 215,000 tons over a two year period at a price of £67 per ton. The Canadian producer is now in production at the rate of about 150,000 tons per yr. Its capacity can be increased, so as to realize greater production economies, to a rate of about 350,000 tons per yr, according to an official. The maximum production rate reached during the war was somewhat over 500,000 tons per yr.

A foreign sales subsidiary, Aluminum Ltd., has created an international sales organization by buying up fabricating plants abroad and construction of additional plants. Among the subsidiaries operating fabricating plants are Northern Aluminum Co. Ltd. (U.K.), 100,000 mt; Aluminum Production Co. of India, Ltd., 2000 mt; Australian Aluminum Co. Pty., Ltd., 2000 mt; Aluminiumwerke A.G. Rorschach (Switzerland), 2000 mt.

Prewar, distribution of Canadian aluminum went to United Kingdom 41 pct, Japan 20 pct, Canada 15 pct, United States 13 pct, Germany 3 pct, and 1 pct each to China, Switzerland, India, Sweden and Russia.

Customs duties for aluminum expressed in U. S. cents per pound, or percentage ad valorem, are shown in accompanying table.

	Shipments from Canada		Shipments from U. S. A.	
	Sheet	Ingot	Sheet	Ingot
1939 United Kingdom	exempt	exempt	15 pct	10 pct
1938 Japan	7.88¢	3.64¢	7.88¢	3.64¢
1939 Canada	—	—	27.5 pct	27.5 pct
1939 United States	6¢	3¢	—	—
1938 Germany	5.32¢	exempt	5.32¢	exempt
1938 China	15 pct	1.3¢	15 pct	1.3¢
1938 Switzerland	8.72¢	6.67¢	8.72¢	6.67¢
1939 British India	30 pct	25 pct	30 pct	25 pct
1939 Sweden	2.73¢	exempt	2.73¢	exempt

All smelters or reduction plants of the Aluminum Co. of Canada, Ltd., are located in Quebec. Wartime expanded capacity of the plants is as follows: Arvida, 345,000 mt; Beauharnois, 33,723 mt; Isle Maligne, 16,327 mt; La Tuque, 34,908; Shawinigan Falls, 81,360; total, 511,678.

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Pittsburgh

• • • **While the reduction** of the price of ingot aluminum by the Aluminum Co. of Canada, was made known last week, the Aluminum Co. of America declined to comment on the significance of such a move at this time on the market in the United States. Obviously, Alcoa had not particularly anticipated such a move, since it was less than a month ago that the company announced a general price increase on a wide range of its own fabricated products.

Alcoa officials, in declining to comment on its Canadian sister's trimming of the ingot price, indicated that as yet there was no consideration being given by Alcoa in meeting this base published price. Added labor costs and operating costs have narrowed down the margin of profit on Aluminum so that price cutting at this time is unwarranted in the American market.

The Aluminum Co. of Canada is a tremendously overbalanced organization in that its ingot producing capacity is completely out of proportion to any finishing or semi-finishing capacity. This is not the case with the American counterparts, either Alcoa or Reynolds, where finishing capacity is emphasized greatly. Further the Canadian company, with an ingot production capacity proved better than 700,000,000 lb a year, is in an extremely low cost power area, has had favorable financing terms, and a favorable labor market. Against these factors is long distance shipment of products, but this is partly overcome by water shipment to the Eastern Seaboard. To get into American markets, it has long been figured that the Canadian company would have to better the American price.

On the other hand, however, the ingot price of aluminum is neither a criterion of aluminum prices nor a good gage of the prices actually being paid. Like many other products, the profit is not in ingot but in fabricated products—sheets, bar, wire, extruded shapes, and the great variety of other products of the industry. So, as a matter of fact, the reduction of ingot prices by the Canadian aluminum producer is not expected to make too big a dent in American markets, since even with the price cut, there is 3¢ a lb import duty that must be paid on Canadian aluminum coming into this country.

English Steel Capacity

London

• • • **The British Iron** & Steel Federation has proposed 4.7 million long tons of new pig iron capacity with the average size of furnaces to run 200,000 tons yearly. It also proposes new steel plants in Lincolnshire and Scotland with furnace capacities running from 600,000 to 800,000 tons. A proposal has been made to import rolling mill equipment from the United States for continuous strip in Wales and for a structural mill in the north.

Brass Mill Products Price Increases Average 2.8¢ Per Lb

Washington

• • • **Supplementing the** 1.5¢ per lb increase granted producers of brass mill products on Apr. 1, OPA has announced a further increase averaging 1.3¢ effective May 1. This rise may be passed along by the distributors.

The increase of Apr. 1 allowed only for wage and material cost increases between August 1945 and Dec. 31; since the first of the year, OPA said, firms producing about 60 pct of the total output have put into effect new approved wage agreements. This action was taken to cover the allowable cost increases since Jan. 1, 1946.

Under the new order, previous increases in base prices and extras are revoked and maximum prices are increased by an average of 2.8¢ per lb over prices in effect during the base period of March 1942.

Discounts from list extras announced Apr. 1 have been further modified for the following two products:

Copper: Seamless tubes (other than pipe and water tubes) smaller than 10-in. OD, reduced from 33⅓ to 20 pct. Alloy Products: seamless tubes (other than pipe and water tubes and phosphor bronze seamless tubes) smaller than 10-in. OD, reduced from 25 to 10 pct.

In addition, the net extras, other than for quantity, for copper and alloy tubes smaller than 10-in. may be increased by 24 pct. No change has been made in the section covering cutting seamless tubes to length.

Brass mill products covered include copper and copper base alloy products produced by rolling, drawing, extruding, rerolling, redrawing including sheets, strips, bars, rods, wire, pipe, tubes and shapes. Not included are wire or cable for electrical transmission, welding wire or rod, babbitt metal lock seam tubes, billets, ingots, copper rods or bars produced and sold by the manufacturer of electrical wire or cable, any fabricated products made from the listed brass mill products or any product for which OPA has established a ceiling price other than by the General Maximum Price Regulation.

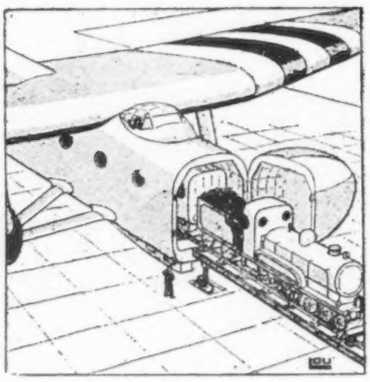
Brass mill products other than those covered by commodity schedules, which are price schedules issued by a producer listing prices for brass mill products sold for particular uses, may be sold at the base price which the seller had in effect in March 1942, plus the following additions:

	Cents per lb
Copper Products:	
Sheets and plates	2.57
Anodes	2.23
Strips and rolls	2.35
Rods (including bus and commutator)	2.42
Seamless tubes (other than water tubes)	2.11
Angles, channels, moldings and open seam tubes	2.35
Extruded metal shapes	2.42
Alloy Products:	
Nickel alloys (all product forms)	4.19
Phosphor bronze (all product forms)	4.95
Sheets and plates	2.61
Strips and rolls	2.61
Rods	2.05
Wire	2.65
Seamless tubes (other than tubes for plumbing)	2.62
Angles, channels, moldings and open seam tubes	2.61
Extruded metal shapes	2.05

The one change made in the second part of the section on products covered by commodity schedules is as follows:

Products for which the price was determined in March 1942, in accordance with a schedule listing net prices (those not subject to list and discount extras) may be repriced by adding 2.8¢ per lb to the net price formerly in effect.

TRANSPORT OF THE FUTURE: **The Aeroplane** *looks into the future when not trucks and jeeps will emerge from transport planes but a complete train replete with freight cars will be landed. (This may be a joke.)*



The following reductions in discount may be made from list prices of copper and alloy pipe and water tubes in effect during March 1942.

(*Reduce percentage discounts in Column A to be the discounts set forth in Column B.*)

	A	*B*
Sales to distributors:		
Under 2,000 ft or lb	37	28
Including 2,000 ft or lb or more	41	32
Sales to consumers:		
Under 2,000 ft or lb	22	13
Including 2,000 ft to 10,000 ft or lb	31	22
Including 10,000 ft or lb or more	35	26

In a new section establishing modifications in prices of certain minor products not otherwise covered by the action announced recently the maximum net price, determined by calculating applicable base price and extras in effect in March 1942, may be increased by 13.2 pct.

In the case of net extras, other than quantity, the net extras in effect in March 1942 may be increased by 12 pct.

In the case of discounts from list extras the following modifications may be made: If the discount in effect March 1942 was 40 pct, reduce to 33⅓ pct; if 33⅓ pct, reduce to 25 pct; if 25 pct, reduce to 20 pct; if 20 pct, reduce to 15 pct.

Reinforcing Wire Ready

Hot Springs, Va.

• • • **At a meeting** of the Wire Reinforcement Institute here on Apr. 24, a survey of the welded wire fabric industry revealed the fact that, despite the scarcity of steel, there will be an adequate supply of road mesh to take care of the highway program this year.

J. C. Shepherd, executive vice-president of the Sheffield Steel Corp. was elected president of the institute for the coming year to succeed Ford P. Schusler of the Keystone Steel & Wire Co.; while W. H. Stewart, sales manager of the reinforcing products division of Truscon Steel Co., was elected vice-president to succeed G. L. Crawford of the Wickwire Spencer Division of the Colorado Fuel & Iron Corp. T. J. Kauer, managing director of the institute was re-elected secretary and treasurer.

New by-laws were adopted by the Wire Reinforcement Institute and it was also decided to incorporate.

Weekly Gallup Polls

Public Favors 1-Yr Strike Moratorium

Princeton, N. J.

• • • **Bernard Baruch recently** told the House Banking & Currency Committee that, among other things, there ought to be a moratorium on strikes and lockouts for at least 1 yr.

The American people think Mr. Baruch's idea is a good one, according to George Gallup, director, American Institute of Public Opinion.

Mr. Baruch went further and declared that if management and labor could not call off strikes or lockouts by agreement, then strikes or lockouts should be prohibited by law for that period.

The American people approve of this idea, too.

Reaction to Mr. Baruch's suggestions was made by questioning throughout the nation among a representative sample of the nation's voting population, as follows:

(1) "Mr. Baruch has suggested that all strikes and lockouts be called off for a year. Do you agree or disagree with this?"

The replies:

	Pct
Agree	70
Disagree	21
Undecided	9

(2) "Do you think a law should be passed forbidding all strikes and lockouts for a year?"

	Pct
Yes	54
No	36
Undecided	10

Although many political observers have pointed out the improbability that Congress will take any such restrictive action during an election year, the survey results indicate the extent to which the public is ready to go at this time in order to effect industrial peace.

The pattern of public thinking on the whole labor-management conflict has been clearly defined in many surveys.

The country fully endorses unionism as a principle. Every poll has shown decisive majorities saying that if a worker wants to join a union, he should have every right to do so.

The public is also on labor's side to a considerable extent in the matter of pay increases. Before and during the recent General Motors strike, institute polls found the country believing a 15 pct wage increase reasonable, even though the public also said it felt higher wages would bring higher prices for consumer products.

But while the country is not anti-union and is in sympathy with many of the union wage demands, it has for some time been anti-strike.

In a recent poll, the institute reported 70 pct saying they thought Congress ought to do something about the strike situation.

The average American outside the labor union movement has apparently felt that unions are using the strike weapon to excess and has favored restrictive measures.

It will be remembered that an overwhelming majority were found in institute surveys to approve President Truman's proposal for fact-finding boards and a 30-day cooling-off period before strikes could be called.

The average American has never accepted the view put forward by some labor leaders, legislators, and members of the National Assn. of Manufacturers, that the public should sit on the sidelines and take an impartial position, while labor and management fight it out.

On the contrary, whenever the general public is hurt by a strike, it reacts quickly and strongly.

Strikes in public utilities—in electric or gas companies, for example—have an immediate effect upon public health and welfare. There is substantial sentiment today for passing a law to stop utility strikes. In a poll on the subject reported last week, 60 pct favored such legislation, while 32 pct were opposed, and eight pct were without opinions.

Baruch Suggestion to Call Off Work Stoppages for 1 Yr Accepted by 70 Pct Polled

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During the war, when the public regarded strikes in war industries as a threat to victory, large majorities, including union members—favored banning strikes in war industries until the war's end.

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• • • **Democratic leaders** anxious to purge the party of certain Democratic Congressmen who have refused to go along with the Administration on major issues may have difficulty gaining support for the purge from the rank and file of party voters.

The American people place far less importance on strict party regularity than do the people of other leading democratic nations. In this country the idea of disciplining a Congressman for not voting with his party on major issues gets a big "no" from the rank and file of party members, a poll just completed by the institute shows.

This is in sharp contrast to the atmosphere prevailing in England, where party members almost without exception adhere to their party's program in parliamentary voting, and may be dropped from the party if they do not adhere. In France, too, there is much talk nowadays of setting up a parliamentary system which will place emphasis on the most rigid party discipline.

In the United States, party irregularity has wide public accept-

(CONTINUED ON PAGE 164)

Gives Priority Aid To Power Press Output

Washington

• • • **Limited priorities** assistance has been made available for the production of mechanical power-driven presses (150 tons or over) because of the acute need of these machines for manufacture of consumer goods, CPA announced on May 3.

Through issuance of an amendment to Schedule I (the critical products list) of PR 28, producers of mechanical power-driven presses of 150 tons or over may apply to CPA for "CC" ratings for production materials and maintenance repair and operating supplies, entering into their product. The agency emphasized that the priorities assistance granted does not include aid for procuring capital equipment or construction.

Second quarter production of power-driven presses is estimated at $12,000,000 compared with an order backlog of more than three times that amount, the agency disclosed. Releases of the smaller presses (up to 100 tons) from War Assets Corp. is expected to relieve some of the demand, according to agency officials, but increased production is the only answer in the case of the larger units.

Canadian Steel Union Wage Talks Underway

Toronto

• • • **Wage negotiations** between the United Steelworkers of America (CCL-CIO) and the three leading basic steel companies of Canada are getting underway. Union officials stated they expected the success or failure of wage negotiations with the Big Three of the Canadian steel industry—employing around 18,000 workers—would set the pattern for wages and hours in the fabricating steel industry of Canada. The union is seeking a 40-hr week, minimum wage of $33.60 a week and asking for other concessions. The steel companies concerned with the new wage demands are Steel Co. of Canada, Ltd., Hamilton; Algoma Steel Corp., Sault Ste. Marie and Dominion Steel & Coal Co., Sydney, N. S. On May 6, Steel Co. of Canada workers began voting on the strike referendum, as also did the workers of the Dominion Steel & Coal Co. Employees of Algoma Steel Corp. have voted overwhelmingly to grant their union leaders strike powers if necessary. Wage negotiations began at Sault Ste. Marie on May 7 with C. H. Millard, Canadian director of the United Steelworkers of America, heading the union's negotiation committee.

Coal Strike Hampers Freight Car Orders

Chicago

• • • **Production on** a backlog of approximately $200,000,000 in orders for freight and passenger cars from Pullman-Standard Car Mfg. Co. is being seriously hampered by the coal strike and by strikes in plants of suppliers, Wallace N. Barker, vice-president, said recently.

Three of Pullman-Standard's plants are continuing production schedules on a hand-to-mouth basis, while a fourth, at Michigan City, Ind., lacking sufficient steel, is 70 pct closed for an undetermined period.

The passenger car works, in Chicago, has shipped no cars since Apr. 17, when the last of the North Western Railway's order for 20 coaches left the plant. No other shipments are scheduled until the week of May 6, because of delays caused by the shortages of material, tied up by strikes in the plants of suppliers. Incoming steel has been further reduced to a trickle by the coal strike.

The Worcester, Mass., plant, with street car and trolley coach work, as well as main line railroad cars to build, is seriously handicapped by other strikes as well as the coal strike. At Bessemer, Ala., work is proceeding on hoppers and box cars at a production rate far less than capacity.

A fifth Pullman-Standard plant, at Butler, Pa., has been out of production for 14 weeks due to a strike, which was settled recently. Work is scheduled to be resumed on freight cars there on a reduced schedule.

GRIST FOR THE MILLS: *These huge shell forgings are being remelted at Ford's Rouge plant. They were bought by Ford when a shell maker's war contract was canceled.*

Siberian Steel Mill Continues to Expand With New 5-Yr Plan

• • • **The Kuznetsk steel** mill located in Stalinsk, Siberia, is second largest in Russia. Its present annual output is 500,000 tons more than prewar. In 1937, 1,600,000 tons of steel or 10 pct of Russia's total output was produced there. Expansion is continuing. The photo at the top shows a weekly production meeting in the director's office. Note where the boss man sits. Also note the working boots on Roman Belan, director.

The middle picture shows an up-to-date physical laboratory at the steel plant. The bottom photo is an apartment house for workers.

The Siberian Institute where metallurgical lectures are given steel workers and apprentices is located in the Kuznetsk area. Cultural centers for recreation, reading and instruction for the steel workers and their families are also provided in the steel town. Pictures of this plant have appeared in past issues of THE IRON AGE.

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Full Employment Tops Agenda of ILO's Steel Committee

Cleveland

By W. A. LLOYD

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• • • **While members of the** Iron and Steel Committee of the International Labor Office approved unanimously subcommittee reports on safety and industrial relations, which were incorporated into resolutions, the controversial status of full employment and the guaranteed annual wage for steel workers was unchanged as the first conference of employers' and workers' delegates from 14 nations came to an end.

From a subcommittee report on full employment, a subject of spirited debate during the 7-day meeting, a resolution proposed by workers' members calling for "the formulation of constructive plans and programs designed to bring about full and regular employment in the iron and steel industry, as far as is possible within the limitations under which the industry must operate" was finally accepted.

Other resolutions from the same report, which were approved in some cases after amendments, called for:

Consideration of the fuel shortage in France, Luxembourg and Belgium, which is responsible for the low rate of operation in the steel industries in these countries, by the ILO and the Economic and Social Council of the United Nations.

Requesting the ILO to make available the results of studies now in progress in the United States under the auspices of the Office of War Mobilization and Reconversion and to conduct similar inquiries into the methods and results of such annual wage schemes as may have been introduced in other countries.

Investigation of the purchasing policies and practices of the largest steel consumers for the purpose of ascertaining to what extent, if any, they tend to influence fluctuations in operations and employment, and what revisions in such policies would contribute toward the regularization of employment in the iron and steel industry.

Study the practices pursued in regard to the introduction of technological improvements in the iron and steel industry and their immediate and long-range impact on employment, with special reference to the training and the absorption of displaced workers into other work, having regard to the rate of labor turnover and wastage.

Implementation of programs for the international exchange of vocational trainees and industrial technicians for the purpose of facilitating the industrial development, particularly in the iron and steel industry, of underdeveloped countries.

Publication by the ILO of statistics relating to employment and economic problems underlying social policies in the iron and steel industries of the various countries, including average weekly earnings and hours of work, labor turnover, industrial accidents, and measurement of employment in terms of manhour production.

A resolution submitted by the workers' members of the full employment subcommittee, calling for establishment of an international organization responsible for planning the distribution of raw materials of the iron and steel industry in relation to the needs and capacity of the producing countries, was withdrawn after Harry M. Douty, U. S. government representative, explained that while the United States was in favor of appropriate international action to improve the distribution of raw materials, it was not convinced that the establishment of an international organization was the best means of achieving the object in view.

Principals in a verbal bout over full employment were John Stephens, a vice-president of U. S. Steel Corp., and David McDonald, secretary-treasurer, United Steelworkers of America.

Mr. McDonald, seconding an earlier worker demand that the committee devise and recommend a full employment program, said

HOW LONG, JOHN, HOW LONG: *Thousands of empty coal cars stretching as far as the eye can see in the Williamson, W. Va., yards of the Norfolk & Western Railroad. They normally handle* 1560 *westbound cars for the Great Lake region and* 3056 *empties were reported recently as the coal strike continues.*

that it was inevitable that a guaranteed annual wage will fit into the problem of full employment.

Mr. Stephens advocating a gradual trend toward the full employment goal, told delegates that while full employment is a normal aspiration of most people, the question is whether it is going to be permitted to develop gradually or whether "in our own impatience to arrive at a goal, which perhaps we envision but incompletely, we shall impair the functioning of industry."

Promising "whole-hearted cooperation toward sound attainment of ever-increasing opportunity for employment," Mr. Stephens, speaking for the management representatives to the conference, said, "to the extent of understanding, and by understanding I mean the understanding of the rights, privileges, responsibilities and opportunities of both parties to the productive process are known, respected and fulfilled, we believe that we can march ahead to a permanent goal of full employment."

The guaranteed annual wage gave cause for a lively round of debate when Lincoln Evans, head of the United Kingdom workers group, said that he was "rather disappointed" that the employers objected to a section of the full employment resolution stating that it was "desirable that the iron and steel industry accept the principle of guaranteed work or wages for workers who remain in continuing service and are retained on the employment register of a given company."

Mr. Stephens declared that the resolution should provide only that studies should be made and experience gained on which conlusions as to the desirability of a guaranteed annual wage could be drawn.

Resolutions stemming from the subcommittee report on industrial relations, unanimously approved, called for right of employers and workers to form organizations of their own choosing, right of collective bargaining, and observance of collective agreements. The subcommittee recommended that every collective agreement contain a clause providing means of amicably settling any disputes which may arise during the period of validity of the agreement.

The subcommittee on safety unanimously decided to ask the ILO to proceed with a study on the regulation and practices concerning the prevention of accidents in the iron and steel industry in the different countries, and to request the necessary information for the preparation of this study from the governments, the employers' organizations and the workers' organizations of the different countries. Resolutions will be referred to the ILO office in Montreal.

While several of the resolutions coming out of the conference were of some significance, particularly to labor, the tremendous divergence in economic and industrial conditions among the various countries represented was brought into sharp focus, giving many observers the impression that the cart had been placed before the horse.

In the opinion of some observers, ILO cannot be truly representative without participation by the Soviet Union, which was thrown out of the League of Nations, of which ILO was a part. Any assumption that the Russians will eventually participate presumes that ILO will become a part of the United Nations, very likely in the Economic and Social Council. If nationalization of the steel industry in **Great Britain** becomes an actuality and the Russians participate in ILO, the function of the Iron and Steel Committee may well resign itself to the exchange of technological data among the delegates, for the cleavage between state ownership and free enterprise will easily transcend the difference in wealth and size.

Until the steel industry throughout the world is in a position to operate at full capacity, questions of full employment and guaranteed annual wages are little more than conjecture. With the steel ingot capacity of all prewar Europe some 53,000,000 tons, Russia 21,800,000 and Great Britain 20,600,000, compared with the United States 88,570,000, the immediate function of ILO's Iron and Steel Committee would seem to be largely academic.

Nathan G. Feinsinger of the University of Wisconsin, and chairman of the fact-finding committee in the recent steel wage case, was chairman of the 7-day conference.

United States delegates to the conference were: Harry M. Douty, director, Labor Economics, Bureau of Labor Statistics, Dept. of Labor; Arthur Wubnig, economist, Office of World Trade Policy, Dept. of Commerce and Murray Ross, State Dept., ILO Branch, ILH Div., representing government; John A. Stephens, vice-president, U. S. Steel Corp., Charles H. Murray, assistant to president, American Rolling Mill Co., J. S. Voss, director of labor relations, Republic Steel Corp., and Grover C. Brown, secretary, Industrial Relations Committee, American Iron & Steel Institute, representing employers; Clinton S. Golden, assistant to president, United Steelworkers of America, CIO and David J. McDonald, secretary-treasurer, USA-CIO, representing workers.

FIRST FROM STEEP ROCK—*The first shipment of iron ore this season from Steep Rock Iron Mines, Ltd., Rainy River district, Northwestern Ontario, being loaded on the steamer* Benson Ford, *which later left the Lake Superior port of Port Arthur bound for the Ford Motor Co. at Detroit.*

French Steel Expansion Program Hinges on Increased Coal Production

Paris

• • • **Future expansion** of steel output in France depends almost completely upon future coal allocations to the industry, according to a statement made recently by the Minister of Industrial Production. Although steady progress was made during the first three quarters of 1945, production remained stationary during the last quarter and the electric power supply position in December seriously affected the output of finished steel products.

Steel production at the end of January of last year was at the rate of 38 pct of the 1938 average production figure, and the figures for pig iron and finished products were 44 pct and 52 pct respectively. Table I indicates the trend of French steel production in recent years as well as the January production figures for 1946.

Production was highest in 1929 with 10,400,000 metric tons of pig iron and 9,700,000 tons of raw steel, and 6,700,000 tons of finished products. Production went down during the next few years owing to the economic crisis and then went up again to 7,450,000 tons of pig iron, 7,950,000 tons of steel and 4,900,000 tons of finished products in 1939. Pig iron production comprised 1,050,000 tons for foundry purposes and 6,400,000 tons for steelmaking. The latter were used to produce 4,700,000 tons of basic steel, 2,600,000 tons of openhearth steel, 550,000 tons of electric steel and 100,000 tons of acid bessemer and crucible steel.

TABLE I

French Pig Iron and Steel Production

	Pig iron	Steel	Finished Products
	(in 1000 metric tons)		
1929	7450	7950	4900
1940	3673	4326	2805
1945	1330	1600	1115
January 1946	193	231	174

Operations at the iron ore mines are considered by the Minister to be satisfactory. Operations are being hampered in the mines by the existence of pithead stocks estimated to exceed 5 million metric tons. The accumulation of these stocks is largely due to the limited production rate of the iron and steel mills. Ore production during the past year was as follows:

	Metric tons
January 1945	160,000
March 1945	401,000
July 1945	667,000
October 1945	1,066,000
January 1946	1,155,000

As a major prewar exporter of iron ore, France has already resumed shipments to Belgium, Luxemburg and the Saar. Negotiations are presently under way to arrange for ore shipments to Britain from mines in western France.

Despite a general shortage of skilled workers, the labor problem in the ore mines has not become critical. The number of miners was up to 18,000 at the end of December compared with about 30,000 in 1938, including both surface and underground workers. With the exception of certain mines in the Pyrenees, no German prisoner labor has been employed to date. If increased allocations of coal to the steel industry permit larger scale operations in the ore mines, the labor problem may become more serious.

Coal allocations to blast furnaces and steel plants remain small and deliveries are generally running far behind allocations. The allocations plan provided for 320,000 tons in January and February and 330,000 tons in March. French officials hope that the tonnage will be increased to 418,000 for April to include 70,000 tons of coke breeze. If this material is delivered it will probably not be put in work before May due to delays in transport and an allowance of three weeks for relighting the coke ovens. Prewar French consumption averaged 800,000 tons per month. The following quantities have been delivered to the mills in recent months:

	Metric tons
January 1945	72,000
June 1945	164,000
December 1945	296,000

In comparison with 154 blast furnaces in operation in France in 1929 and 101 in 1938, there were only 27 in blast at the end of January. At the present relighting depends on the future availability of coal.

GREEN LIGHT: *A view of one of the* 50 *new locomotives which the British are building for export to the South African Railways. It is over* 88 *ft long and is designed for long-distance haulage. It can carry* 10 *tons of fuel and* 5560 *gal of water.*

The London ECONOMIST

Party Fusion in Germany

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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IT WAS said of Catherine the Second that she sent some of her courtiers and officials to the gallows because they showed an excess of zeal in carrying out her orders. It seems that some such excess of zeal has been shown by Marshal Stalin's representatives in Germany—or perhaps only by the German Communists—in pressing for the fusion of the Socialist and Communist Parties. The formal fusion has now been achieved in the Russian zone of Germany and in the Russian sector of Berlin. At Easter a joint conference of Social Democrats and Communists took place in Berlin which ended in the formal dissolution of the two parties and the proclamation of the "Socialist Unity Party." The leaders of the two factions, Herr Pieck and Herr Grotewohl, symbolically shook hands on the stage of the Opera House. Not a single dissentient voice was recorded when the conference came to vote on unity. If other evidence were lacking, this unanimity by itself would be sufficient proof that the proclaimed unity is not very real. Normally, two parties that have been bitterly opposed to one another for nearly three decades do not fade out or merge in so meek and unanimous a manner. The weight of their separate traditions and party patriotisms usually revolts against abdication and produces at least splinter groups which melodramatically swear allegiance to old party caucuses and party slogans. That the fusion of two parties has not been as spontaneous and voluntary as its sponsors pretend was shown very clearly in the light of the plebiscite which took place in the Berlin organization of the Social Democratic Party a few weeks ago. Wherever the members of the Social Democratic Party were given some freedom to express their views, opposition to the merger came into the open. It can only be deduced from this that if no such opposition has come to light in the Russian zone it is only because the opposition has been suppressed.

WHAT has been the Russian motive in forcing the merger upon the two German labor parties? It is not easy to find a plausible explanation. Throughout the rest of their zone in Eastern Europe, the Russians have been satisfied with encouraging as close a cooperation as possible between the Socialists and Communists. Neither in Poland nor in Hungary nor in Finland have they pressed for formal unification. Their policy in Germany has in this respect been something of an exception to the rule. It may be that the exception is about to be made into the rule; and that sooner or later the other Socialist Parties in Eastern Europe will be asked to consent to complete self-effacement. Or it may be that the Russians do not attach quite the same importance to the working class parties of the predominantly agrarian countries of Eastern Europe as they attach to the Labor movement in Germany. In post-Nazi Germany—so they may have calculated — the industrial working-class is destined to become the most important social and political factor, despite the policy of industrial disarmament. Germany is, and for a long time will continue to be, the most important meeting-ground of east and west, the battle-ground of conflicting programs and ideologies. Russia's allies are on the Left; and therefore the Left ought to be united and strengthened, at whatever cost. This motive has probably prompted the Russians to act as the foster parents of the Einheitspartei.

Nobody was probably more aware of the bogus character of the newly achieved unity than the leaders of the two parties when they shook hands for the benefit of the publicity agents of the Einheitspartei. Yet there is in Germany some real substance in the desire for a united German labor movement. The split between the Communist and Socialist Parties in Germany dates from 1918. At that time the old Social Democratic Party, headed by Noske and Scheidemann, had spent the war preaching national unity and supporting more or less openly the war policy of Imperial Germany. On the other hand there was the anti-militarist and revolutionary faction headed by Karl Liebknecht and Rosa Luxemburg who had branded the central committee of the Social Democrats for its "social patriotism and social imperialism." After the war the Social Democrats preached, in a Fabian spirit, the doctrine of "the inevitability of gradualness" in the evolution from capitalism to socialism, while the Communists propagated the revolutionary seizure of power and the dictatorship of the proletariat more or less on the Soviet model. In no other European country between the two wars was the cleavage as deep and acute as in Germany. Immediately before the Nazi upheaval, the vote of the working-class was almost equally divided between the two parties.

IN the light of the events of the last 10 yr, the cleavage must have seemed to many German workers very out of date. Under the Nazi regime both parties, or their remnants, could only pray in silence for Germany's defeat. There was no scope for "social patriotism" this time. Many Germans now feel

(CONTINUED ON PAGE 165)

USS Income Declines Due to Steel Strike; Coal Strike Threatens

New York

• • • **Following the** quarterly meeting of the directors of the U. S. Steel Corp., Irving S. Olds, chairman, reported that the corporation's ingot operations this week have been reduced to 45.5 pct of capacity, the rate in Pittsburgh having dropped to 21.5 pct and in Chicago to 45.4 pct. The steel loss during the coal strike was estimated to be 800,000 tons because of a coal loss of 2.5 million tons.

Mr. Olds said that the severe loss to the corporation was due to the fact that there were no storage facilities for coal in the Pittsburgh area and therefore millions of tons of coal produced in the Pittsburgh district during the steel strike had to be sold at that time affording no carryover for the current period. This was said to be true to a lesser degree in the Chicago area.

The U. S. Steel Corp. is seriously considering the effect of the proposed 25 pct freight rate increase on the distribution of the company's products. While the proposed rate as applied to steel products is reported to average 80¢ per ton, this amount would be likely to exercise considerable leverage on the corporation's studies of broader dispersal of production facilities. In this connection Mr. Olds stated that there had been no authorization for the construction of an eastern steel mill although it is known on good authority that plans have been formulated for such a plant in the East to take care of the effect of increasing freight rates and expanding basing points for many steel products.

Income for the first quarter of 1946, before declaration of dividends, is reported as $10,238,271, but a loss of $13,594,746 would have been incurred had there not been created during the war a fund to cover abnormal costs arising out of the war.

Reported income for the first quarter does not reflect any part of the cost of the steel strike, but there was a loss for tax purposes in the first quarter due to the strike. To prevent a possible distortion in operating figures for subsequent quarters of 1946, when operations may be of a more normal character, it seemed advisable to the company to consider estimated taxes for the full year so that each subsequent quarter might stand its proper tax cost in relation to its operating results. Therefore, a credit of $6,800,000 for income tax is reflected in the reported income for the first quarter.

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Inland Plans Sheet Capacity Expansion

Chicago

• • • **Inland Steel Co.** will spend approximately $12 million on an expansion program which will increase its annual capacity for producing cold-rolled sheet products of 480,000 tons a year, Wilfred Sykes, president, announced recently.

Inland now has annual capacities of 420,000 tons of cold-rolled sheets and 180,000 tons of cold-rolled strip. Plans for the expansion have not been entirely completed, but are being pressed, and construction will get underway as soon as practicable.

Mr. Sykes also said that the War Assets Corp. has canceled the company's lease on two 1200-ton blast furnaces built during the war, and that bids for their purchase from the government are expected to be requested soon. Inland hopes to participate in the bidding, he indicated.

At the company's annual meeting, stockholders voted to split Inland's common stock three for one, effective immediately. The first quarter statement shows 1,633,105 shares of stock issued and outstanding.

During 1945, Inland produced 3,507,686 tons of ingots, or at a rate of 103.2 pct of capacity, Mr. Sykes reported. Net profits after taxes for the year amounted to $9,861,210, or at the rate of $6.04 per share.

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Armco Earnings Down

Middletown, Ohio

• • • **American Rolling Mill Co.** reports net earnings for the first quarter of 1946, ended Mar. 31, were $1,804,487 after all charges. This equals 40¢ per share on common stock, after provision for preferred dividends. This compares with consolidated earnings for the first quarter of 1945 of $1,875,502, equal to 48¢ per common share after all charges and allowance for preferred dividends.

Allegheny-Ludlum Net Off For First Quarter

Pittsburgh

• • • **Allegheny Ludlum** Steel Corp. announced that operations for the first quarter of 1946 resulted in net earnings of $252,043, compared with $936,690 for the first quarter of 1945. H. G. Batcheller, president, said that the earnings were adversely affected by the 29-day strike which closed most of the plants of the company early in the quarter.

The net income, after providing for Federal income taxes of $172,800, was earned on a sales volume of $16,000,000. The company is currently operating at a rate of approximately $8,400,000 sales volume per month. This rate of operation, Mr. Batcheller said, is still not a true index of the eventual peacetime demand. Demand for bar materials in stainless and alloy steels has been slow in developing its full potential, due apparently to the reconversion and many other difficulties which have confronted so many users in this category. On the other hand, demand for flat-rolled, both in stainless and electrical steels, has been in excess of supply; and from present indications, this condition promises to continue for some time.

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Republic Shows Net Loss

Cleveland

• • • **Republic Steel Corp.,** has reported consolidated net loss for the first quarter of 1946 of $347,412, compared with a consolidated net income of $3,084,548 in the corresponding quarter of 1945. Income in the first quarter was credited with a minimum tax credit of $1,815,000 and restoration from contingent reserves of $3,100,000 to cover approximate net excess charges in January and February 1946 due to the steel strike.

Claims Pittsburgh Has Lost Some Advantages As Major Steel Center

Pittsburgh

• • • **J. L. Perry, president,** Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, one of the speakers before the Institute of Community Problems of the University of Pittsburgh, called for more diversified industry to offset growing local disadvantages in Pittsburgh's keystone steel industry.

J. L. Perry

He pointed out that while Carnegie - Illinois Steel Corp. has and will continue to have some of its largest investments in this area, Pittsburgh no longer has the advantages it formerly held in relation to markets for steel and availability of raw materials.

Mr. Perry explained that for several years "the density of consumption of steel has been moving away from Pittsburgh" and "as transportation costs rose—other centers of steel manufacture developed closer to the main growing centers of steel consumption," which, he said, "worked toward more and more restrictions of the marketing areas in which Pittsburgh steel manufacturers can compete advantageously."

Pittsburgh's other former advantage "availability of raw materials" has also changed since the early days of the industry, Mr. Perry said. "With the discovery and development of iron ore in the northern ranges along the Great Lakes, Pittsburgh found itself at some disadvantage as compared with Lake manufacturing points in the cost of securing ore." At the same time, he pointed out that "with greatly increased demand, the supplies of the choice coals such as Klondike and Connellsville coking coals approached exhaustion, with consequent further disadvantage to Pittsburgh steel manufacture, even though tremendous reserves of other bituminous coals are still available in this vicinity."

Also the trend of national factors highlights Pittsburgh's disadvantages at the present time. He said, "The high costs and low prices in the steel industry today bring about the paradox that, in a period which would normally be one of greatest prosperity in history for the steel industry, we are striving to keep our heads above water at a time when the demand for steel far exceeds available supply. This is particularly alarming because in a cyclical industry like steel it is imperative that substantial profit be earned in years of high volume if the inevitable losses of years of low production are to be offset."

Mr. Perry also said that "we must logically expect that when it is necessary for some of the present steel manufacturing facilities in Pittsburgh to be replaced they will be installed at locations nearer to the concentrated consumption of steel, and there will be some reduction in the total ingot capacity in the Pittsburgh area." He added that he was confident that this would be "for the ultimate advantage of Pittsburgh—because I hope for greater diversification of industry here with attendant greater stability of employment."

Scientific Leaders To Attend Westinghouse Centennial Meeting

Pittsburgh

• • • **The world's leading** scientists and engineers, men whose names and achievements dominated the headlines of World War II, will meet May 16, 17 and 18 at the George Westinghouse Centennial Forum commemorating the 100th anniversary of the birth of George Westinghouse, founder of the Westinghouse Electric Corp. Included are leaders in the development of the atomic bomb which so abruptly halted the war against Japan, in medical and biological science, transportation, education and electric power—the keystone of the modern industrial world.

M. W. Smith

The program for the 3-day forum, M. W. Smith, Westinghouse vice-president, said, would be keynoted by discussions on "Science and Civilization," with Dr. Robert E. Doherty, president of the Carnegie Institute of Technology, acting as chairman of the symposium.

First on the program will be an address on "Scientific Ethics," by Dr. Archibald V. Hill, foreign secretary, Royal Society, England. Dr. Isaiah Bowman, president of Johns Hopkins University, will speak on "The Social Composition of Scientific Power," and George W. Merck, president and director of Merck & Co., will discuss "Peacetime Implications of Biological Warfare."

The Thursday afternoon session will comprise a symposium on "The Future of Atomic Energy," with Dr. Frank B. Jewett, president of the National Academy of Sciences, acting as chairman. This discussion will feature well known atomic experts.

At a dinner meeting following the atomic session, Dr. I. I. Rabi, chairman of the Physics Department of Columbia University, will act as chairman. Dr. Vannevar Bush, director of the Office of Scientific Research and Development, will speak on "Planning in Science."

The program for Friday, May 17, will deal with "Transportation—A Measure of Civilization," and "Biological Science." Transportation will be taken up in the morning session with Robert P. Russell, president of the Standard Oil Development Co., acting as chairman.

Dr. Edward Warner, president of the Interim Council, Provisional International Civil Aviation Organization, will discuss the "Aviation" phases of transportation. Vice-Admiral Emery S. Land, U. S. Navy (retired), former chairman of the U. S. Maritime Commission, will speak on the "Marine" aspects of transportation. Martin W. Clement, president of the Pennsylvania Railroad, will talk on "Rail" matters and Dr. Charles F. Kettering, vice-president of General Motors Corp., will speak on "Automotive."

Industrial Briefs . . .

• WASHER GROUP MOVES—The American Washer & Ironer Manufacturers' Assn. has moved its headquarters from 111 West Washington St., Chicago, to the First National Bank Bldg. there. Allyn H. Noelke is the association's executive secretary.

• NEW MILWAUKEE FIRM—General Electric X Ray Corp.'s bid of $3,700,000 for the plant No. 1 property of the Supercharger Works, Milwaukee, has been accepted by the War Assets Administration. The plant was built by the government for Allis-Chalmers Mfg. Co. and has stood idle since the end of wartime production.

• CREATES NEW DIVISION — American Car & Foundry Co. announces that the company is extending its welding activities by establishing a Welded Products Div. which will concentrate on the design, development and manufacture of weldments.

• OFFERS PLANT FOR SALE — American Radiator & Standard Sanitary Corp. will offer its Buffalo Malleable Iron & Steel plant for sale and withdraw from the job casting field. It was emphasized the move has no connection with a strike of the United Steel Workers that has been in effect since January.

• NEW ORGANIZATION — The formation of Otis Angier & Associates, Framingham, Mass., offering new methods and materials for protective packaging, has been announced by Otis Angier, formerly president of Angier Sales Corp. of Framingham.

• MACHINE TOOL PLANT—Ground will be broken for the new plant of the Lucas Machine Tool Co. and construction is scheduled to start during the last quarter of the year, according to the company. The new plant will contain about 60,000 sq ft of floor space.

• CANADIAN SHIPBUILDING—Burrard Drydock Co., Ltd., has purchased Yarrows, Ltd., which makes the former firm one of the largest shipbuilding companies in Canada. Burrard Drydock Co. has four large building ways for 10,000-ton ships in Vancouver, B. C., and one small one, and now takes over the two large building ways and two smaller ways of Yarrows at Esquimalt, B. C.

• COMPLETES FOUNDRY—J. E. Hahn, president of John Inglis Co., Ltd., Toronto, announced that plans have been completed for the construction of a foundry specially designed and equipped for the production of special castings.

• GETS GREEN LIGHT—Worcester Pressed Steel Co. has been granted government permission to erect a 140 by 90 ft manufacturing plant which, with equipment, will cost $60,000. Company has the largest backlog of business than in any peacetime year.

• RAILWAY SUPPLY FIRM—Champion Transportation Sales, Inc., has been formed to handle sales of railway supplies on a national basis. Offices will be located at 9 S. Clinton St., Chicago.

• WAR VET RE-ELECTED—Andrew A. Engelhardt again has been elected secretary-treasurer of the Chicago chapter of the American Society for Metals, in which capacity he was serving when he resigned to join the Army in 1942. He has resumed his association with C. H. Martin, Chicago, manufacturers' representative.

• TO REPRESENT—Fox Engineering Co., Jackson, Mich., has appointed the Bert Carpenter Co. to represent it in the territory comprising eastern Michigan, northern Ohio and northeastern Indiana.

France Frees Cutlery From Export Controls As Alloy Output Gains

Paris

• • • **The export ban** on cutlery which has controlled the prewar $4 million industry has been lifted here recently. Despite the shortage of raw materials and fuel, the French cutlery industry last year had a turnover of $5,880,000 and negotiated export agreements with Canada, Switzerland, Cuba and Egypt.

In prewar days the cutlery industry in France had an annual steel consumption of 4000 to 5000 metric tons, including about 1500 tons of stainless. In 1945 consumption amounted only to 3000 tons of carbon steel as the ban on the manufacture of stainless steel products was continued. Theirs and Nogent where the majority of the cutlery plants are centered have not suffered severe war damage.

The decision to lift the export ban is a result of the recent removal of restrictions on production of stainless steel articles and the uncontrolled sale of stainless steel. The removal of restrictions on stainless is possible due to improvement of electric steel production in the central districts of France and in the Alps. Production in these districts is now approximately 80 pct of the prewar output due to the improved electric power output.

Further increases in electric steel production will be controlled by the supplies of chromium and the electrodes which must be imported. At present the steel allocations to cutlery manufacturers will be based on their prewar consumption until such time as the steel sales are released from control.

The cutlery industries of both Britain and France are favored by their respective governments as potential sources of urgently needed foreign exchange. Sir Stafford Cripps recently stated in the British House of Commons that the cutlery industry there in 1945 did approximately $4 million worth of export business.

Construction Steel...

New York

• • • **A slight decline** in new structural inquiries for private work is noted by several major sales offices, but this is being offset by a heavy volume from federal, state, and railroad projects. The volume of outstanding inquiries for private work is close to a new high in the history of the industry, but many of these projects appear to have become at least temporarily dormant pending approval of construction. Structural shipments, already hit by the coal strike, took another sharp drop last week as additional mills succumbed.

• • • **Fabricated steel awards** this week included the following:

13,000 Tons, Boston, building for John Hancock Life Insurance Co., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., Boston, engineers.

5000 Tons, Flagstaff, Ariz., steel bridge over Canyon Diablo on Santa Fe main line, A.T.&S.F. Ry. Co., Los Angeles, through Kansas City Bridge Co., to Kansas City Structural Steel Co.

1350 Tons, Fulton, Mo., tunnel kiln building, Harbison-Walker Refractories Co., to American Bridge Co., Pittsburgh.

1200 Tons, Princeton, N. J., university library, to American Bridge Co.

1200 Tons, Middletown, Pa., Metropolitan Edison Co. building, Gilbert Associates, to Belmont Iron Works.

1100 Tons, Parkersburg, W. Va., additions to du Pont plant, to Bethlehem Fabricators, Bethlehem, Pa.

645 Tons, Elizabeth, N. J., bridges on Route 25, contract 2, Poirer & McLane, low bidder.

645 Tons, Syracuse, N. Y., laboratory buildings, to Fort Pitt Bridge Works, Pittsburgh.

475 Tons, Rochester, N. Y., Woodward Clinic, to F. L. Heughes & Co., Inc., Rochester, N. Y.

300 Tons, Birmingham, Ragland Bros. Co., warehouse, to Southern Steel Works Co., Birmingham: Ralph A. Smallman & Co., contractors.

280 Tons, Philadelphia, P. V. Engineering Forum, to Robinson Steel Co.

275 Tons, Newark, N. J., turbine foundation, Public Service Electric & Gas Co., to American Bridge Co., Pittsburgh.

256 Tons, Estes Park, Colo., steel tunnel supports, Prospect Mountain tunnel, Big Thompson project, Bureau of Reclamation, Denver, through Lowdermilk Bros., to Comm. Shear & Stamp Co., Youngstown, Ohio.

250 Tons, Chicago, warehouse addition, through James McHugh Construction Co., to American Bridge Co., Pittsburgh.

214 Tons, Chicago, warehouse addition, Benjamin Wolff & Co., to American Bridge Co., Pittsburgh.

210 Tons, Scranton, Pa., Pennsylvania Dept. of Highways, bridge for Green Ridge St., Pine Brook Iron Works, low bidder.

190 Tons, Elizabeth, N. J., bridges on Route 25, contract 4, S. J. Groves & Sons, low bidder.

150 Tons, Vail and Denison, Iowa, bridges 851.5 and 853, Chicago & Northwestern RR. to American Bridge Co., Pittsburgh.

150 Tons, Robertsville, Mo., bridge 39.8, St. L. & S. F. Railroad, to American Bridge Co.

100 Tons, Atlanta, remodeling store, to Southern Steel Works Co., Birmingham, Barge Thompson, contractors.

100 Tons, Detroit, Stewart Foundry Co., to Fort Pitt Steel Corp. and Wisconsin Steel Co.

• • • **Fabricated steel inquiries** this week included the following:

3700 Tons, Milan, Ill., state highway bridge.

2900 Tons, Newark, N. J., on Route 25A, vertical lift bridge for New Jersey Dept. of Highways, bids due May 22.

2448 Tons, Fort Peck, Mont., steel risers, surge tanks, etc. for Fort Peck Powerhouse, U. S. Engineer Office, Fort Peck, Ser. 24-016-46-33, bids to open about June 3.

2000 Tons, Coulee City, Wash., Bacon Tunnel supports, bids to U. S. Bureau of Reclamation.

2100 Tons, Reading, Pa., bridge, Reading Co.

1200 Tons, Middletown, Pa., power station addition for Metropolitan Edison Co.

600 Tons, Vandalia, Ill., Kaskaskia River highway bridge.

420 Tons, St. Louis, Missouri-Kansas-Texas railroad truss span and bridge repairs.

300 Tons, Los Angeles, addition to Johns-Manville, Los Angeles plant.

300 Tons, Los Angeles, addition to main building, Associated Telephone Co., M. Sasso, general contractor.

150 Tons, Hunlock Creek, Pa., United Engineers turbo generator foundation, bids in May 6.

150 Tons, Philadelphia, Inquirer building, bids in May 7.

103 Tons, Exeter, Calif., Yokohl Creek bridge, California Div. of Highways, Sacramento, bids due May 29.

• • • **Reinforcing bar** awards this week included the following:

3100 Tons, Philadelphia, Inquirer building, to Bethlehem Steel Co., Bethlehem, Pa.

586 Tons, Los Angeles, four bridges on Pacific Coast Highway between Dominquez Channel and San Gabriel Ave., through Jas. I. Barnes Construction Co., to Soule Steel Co.

100 Tons, Winthrop, Mass., seawall repairs, to Northern Steel Co., Boston.

100 Tons, Leicester, Mass., reservoir filter, to Northern Steel Co., Boston.

• • • **Reinforcing bar** inquiries this week included the following:

3150 Tons, White River, Ark., Bull Shoals Dam.

815 Tons, Friant, Calif., miscellaneous bars, Bureau of Reclamation, Denver, Inv. A-48,764-A-2, bids due to May 14 (readvertisement).

• • • **Sheet and bearing** pile inquiries this week included the following:

8700 Tons, Bremerton, Wash., sheet and bearing piles for Navy piers.

7000 Tons, Tongue Point, Ore., Navy mooring basin.

2100 Tons, Milwaukee, Pere Marquette Railway dock.

2200 Tons, Galveston, Tex., morgues.

Coming Events

May 21-22 American Steel Warehouse Assn., Inc., annual meeting, New York.

May 23 American Iron & Steel Institute, general meeting, New York.

May 29-31 Machinery Dealers National Assn., Atlantic City, N. J.

June 2-7 Society of Automotive Engineers, summer meeting, French Lick, Ind.

June 3-5 American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va.

June 13 Metal Powder Assn., spring meeting, New York.

June 17 American Society of Mechanical Engineers, machine design group, first session, Detroit.

June 17-18 American By-Product Coke Institute, first annual meeting, Seaview Country Club, Absecon, N. J.

June 17-20 American Electroplaters Society, annual convention, Pittsburgh.

June 24-28 American Society for Testing Materials, annual meeting, Buffalo.

Sept. 10-14 American Chemical Society, exposition, Chicago.

Sept. 11-12 Society of Automotive Engineers, national tractor meeting, Milwaukee.

Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.

Oct. 3-5 National Electronic Conference, Chicago.

Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.

Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.

Nov. 7-8 National Founders Assn., annual meeting, New York.

MACHINE TOOLS

. . . News and Market Activities

Feels Delayed Effects of Coal Strike

• • • **Builders of special** purpose machine tools in Illinois and Wisconsin, whose order books have escaped the deterioration affecting some builders of standard machines, are beginning to get a delayed kickback from the coal strike through the curtailment of castings production.

Most foundries went into the coal strike period operating on almost a day-to-day basis on coke and pig iron, and with country scrap coming to the market only in a trickle, are hard hit. Few have escaped sharp cutbacks in already restricted production rates and a wave of strikes appears to be just around the corner.

Full effect of the situation on tool deliveries will not be felt until machines now in the shops have been delivered, and new castings are required. The almost inevitable consequence will be the lengthening of delivery dates of machines now on order by several weeks, depending on the duration of the coal strike. Conservative estimates in the trade indicate that even if the strike is settled in the next fortnight, deliveries on tools not yet in the production shop will be retarded by about two months.

An additional brake on machine tool production in the Chicago area arising from the strike is the restriction of use of industrial power to 24 hr per week. In the first full week of operations under the power restriction, most shops are choosing to take their 24 hr in the form of three 8-hr days, closing down for the balance of the week.

It now appears probable to some observers that no broad pattern will emerge on machine tool price increases but that advances will be made on an item-to-item basis with a sharp eye toward competitive conditions. Many builders are arming themselves in order acceptance by either outright provision for an increase with definite percentage limits or by a special stipulation that billing will be on the basis of prices in effect at the time of delivery.

Only a few items have been raised the full 20 pct, and no general trend toward this limit is in sight on tools affected. On tools removed from price control, an average increase of more than 20 pct appears highly unlikely and could very well fall below this figure.

Continued poor sales reports on many types of tools are making any price increases at all on some items appear out of the picture. Every day of delay in announcing new prices is creating a greater reluctance on the part of manufacturers in highly competitive lines to take the lead in a price advance.

Current conditions, sources in the trade report, do not augur well, for much of the excess of capacity the industry has on its hands, and a good deal of it will go out the windows in the next two or three years. Such plants must be supported without any help from taxation, and it is expected that public financing and consolidations will be the order of the times in many cases. Thus, some segments of the industry are preparing for the sporadic and serious forays of "1921 all over again."

In Cincinnati, unsettled labor conditions continue to disturb the local machine tool market. While only a few shops are affected directly by strikes, some builders have found that the coal strike and turbulent currents in the railroad industry combined with the aftermath of strikes in electrical equipment makers' plants, make production planning difficult, to put it mildly.

Builders feel that much business, both domestic and foreign, is available, but users are hesitant to place orders because of labor problems and shortages of materials. Production in most machine tool plants in the Cincinnati area is at a fair level, and making wide inroads into backlogs.

In the East, trade sources report business quiet, claiming at one moment that any recent upward price adjustment is not a market factor, and declaring that business will not improve materially until the government-owned machine tool surplus is cleaned up, the next.

In Detroit it has been reported that Chrysler Corp. has postponed delivery of large presses on order for present delivery until the spring of 1947, thus relieving somewhat the demand for heavy equipment of this type.

New Export Policy

Washington

• • • **WAA has announced a new export policy designed to facilitate export sales of government-owned surplus machine tools and certain other production equipment through "approved dealers."**

The new policy will permit an "approved" machine tool dealer, holding an actual order from a foreign purchaser, to effect the purchase in his own name and subsequently transfer title to the customer abroad. Upon presentation of a certificate to the effect that the property has been transferred to the purchaser at the WAA price, the "approved dealer" may then submit claim for his commission. Heretofore, no commission would be allowed by WAA for any transaction made through an "approved dealer" unless the customer purchased directly from WAA and paid the purchase price simultaneously.

Tool Repairs Increased

Washington

• • • **The price increase** factor of 17.3 pct which OPA granted to manufacturers and resellers of cutting tools on Apr. 24 will soon be extended to apply also to repair services on the tools affected.

OPA says this additional increase will return to the industry its base period profits during the next 12 months. The increase for repair services will apply to repairs on all cutting tools, attachments and accessories for machines covered by the Apr. 24 increase.

HYDRAULIC PRESSES

by

Colonial

COLONIAL hydraulic presses are not built to a price. Their low cost is due to quantity production resulting from their universal applicability to hundreds of different types of jobs. All machines have high overload reserve capacity.

For broaching
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for straightening
for forming
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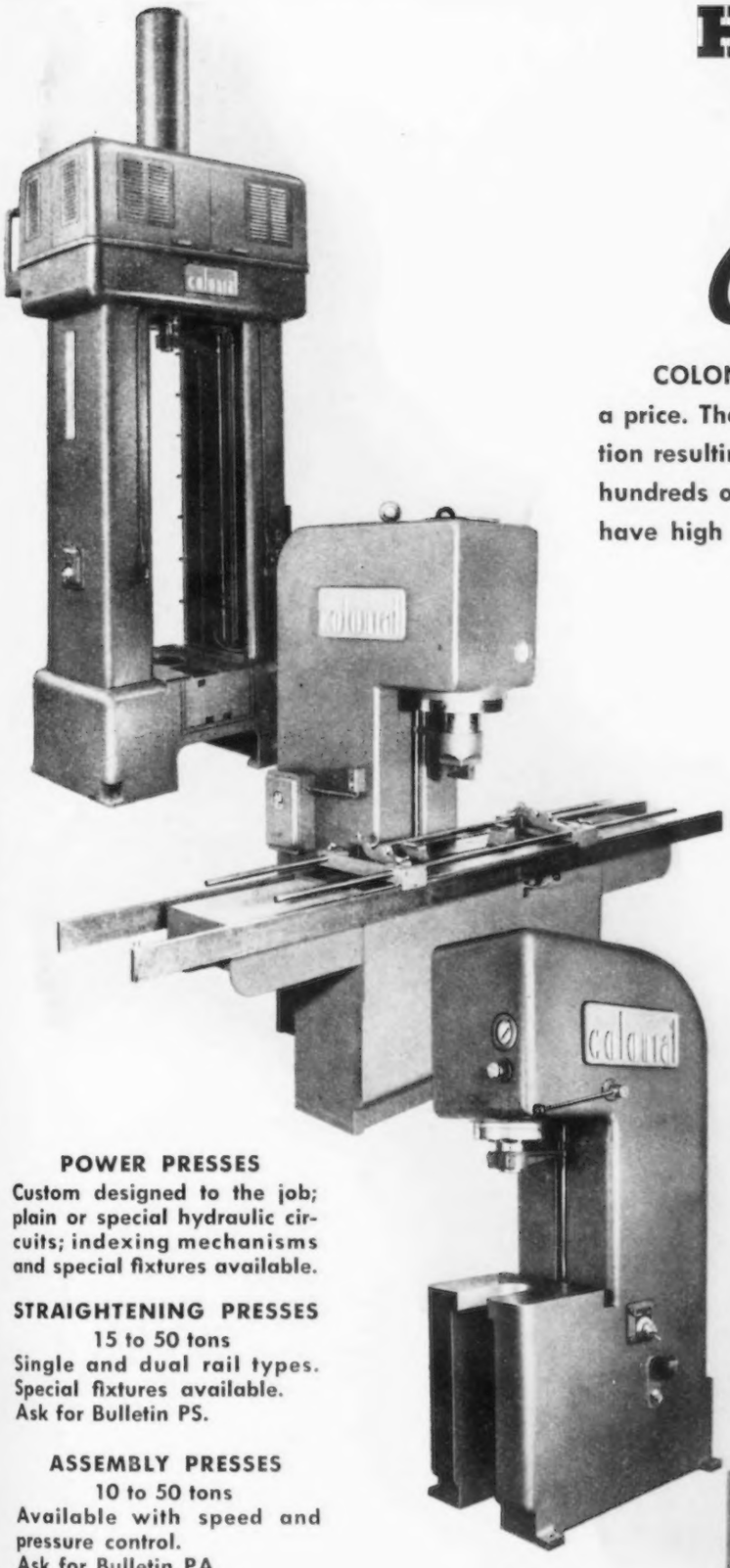
for aluminum and magnesium



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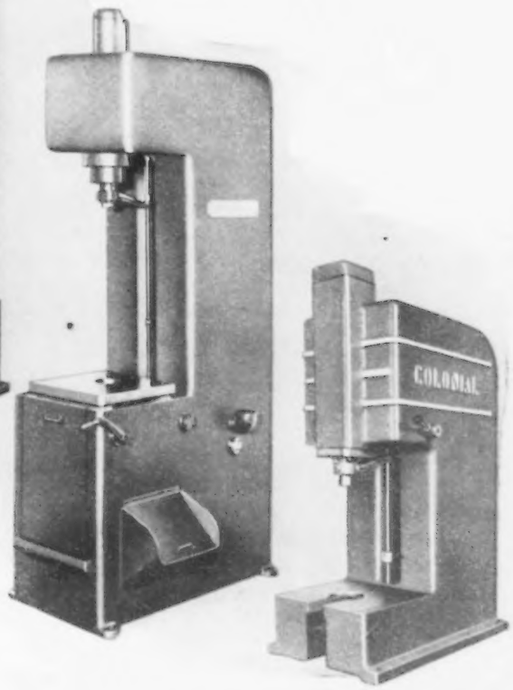
POWER PRESSES
Custom designed to the job; plain or special hydraulic circuits; indexing mechanisms and special fixtures available.

STRAIGHTENING PRESSES
15 to 50 tons
Single and dual rail types.
Special fixtures available.
Ask for Bulletin PS.

ASSEMBLY PRESSES
10 to 50 tons
Available with speed and pressure control.
Ask for Bulletin PA.

"UTILITY" PRESSES
4 to 10 tons
Available with speed, pressure and dual safety controls; pulldown attachment.
Ask for Bulletin VBS.

"JUNIOR" PRESSES
1 to 4 tons
Available with pedestal and with straightening or pulldown attachment.
Ask for Bulletin VJ-1.



NONFERROUS METALS

. . . News and Market Activities

Copper and Brass Need Wage, Price Solutions

New York

• • • **The copper and** brass production line is in approximately the same position this week with mine production still down due to labor trouble which has not been resolved by the activities of the fact finding board which recommended a wage increase of 18½¢ per hr. Action on the finding continues to be held up by disagreement on the increased price for copper between industry and government. It is understood that this decision rests now with the Stabilization Administrator and there is some hope of an early decision. Meanwhile there is a serious shortage of copper.

See p. 119 for information on Brass Mill Product Prices.

The brass mill situation is unchanged, with American Brass Co. still at loggerheads with the union over non-wage problems. Considering the copper shortage, there is little or no pressure of competition acting to bring the two parties to the dispute into closer harmony.

•

Zinc Grades in Demand

New York

• • • **While the stockpile** of zinc continues high and consumption has fallen off appreciably during the steel strike, according to trade sources, available supplies of the grades in greatest demand are limited. There are shortages apparent in Special High Grade zinc which is designed for use by die casting shops, a grade in which impurities are held to a very low level. Facilities for the production of this type of zinc are relatively limited and the expansion of zinc die casting operations has been tremendous since the end of the war. Nevertheless, since there is no differential in price between this grade, High Grade and Intermediate, brass mills feel free to demand it for their production requiring a low level of impurities.

Prime Western is another grade of zinc which is in inadequate supply. Producers consider that the reason for the short supply in this grade is the price differential which has encouraged the upgrading of zinc by some producers.

•

Freeze Cadmium Stockpile

Washington

• • • **Government-owned** stockpiles of cadmium have been frozen at present levels and releases will be made for emergency needs only, CPA has announced.

This action was taken because cadmium production faces a loss of 45 pct because of work stoppages, the agency said. Government-owned stocks amounted to only 685,472 lb as of Mar. 31.

At the same time, CPA requested cadmium producers and distributors to go on a voluntary ration basis in filling orders in conformance with the following policy:

Rationing of producer deliveries so that no individual or consumer class will receive more than immediate needs; rationing by distributors and all types of cadmium users so as to supply minimum needs of the largest number of customers, giving each a proportionate share.

The present 30-day inventory limitation under PR 32 will continue and the government will release cadmium from its stockpile only for emergency maintenance and repair having to do with public safety and health providing it is unobtainable elsewhere.

•

Platinum Price Rises

New York

• • • **Since the end** of price control over the platinum group metals at the end of April with revocation of MPR 309, prices of platinum and iridium have increased significantly based on actual sales by producers.

The price of platinum which had been held to the ceiling of $35 per troy oz has jumped to $56 in retail lots of less than 100 oz, $50 in wholesale lots.

Iridium, with a ceiling price of $165 per troy oz, has been selling in the range of $90 to $100 per oz. The price of this metal has increased to $110 in what might be termed the bullish market trend for these precious metals. In wholesale lots, this metal is quoted at $110.

•

Industry Bars Allocation

New York

• • • **Government action** in freezing the cadmium stockpile although not returning this metal to allocation reflects the wishes of producing and consuming industry to avoid the difficulties and delays involved in the allocation procedure.

It has been apparent to the metal industry for some time that government action would be required to make the diminishing supply of cadmium serve the most useful purpose. This condition has been brought to a head by the current wave of strikes in domestic lead and zinc mines, from which cadmium is a secondary product.

Farm Equipment Down

Washington

• • • **Reflecting the** cumulative effects of the recent steel strike and the existing coal strike, March farm machinery production continued the downward trend that developed in February, according to CPA.

Despite the settlement of work stoppages by a major farm machinery producer and the longer work month, March output declined 1.2 pct to $48,591,809 from $49,186,443 in February. The March total was 20.6 pct below the January 1946 production of $61,199,366 and 26.4 pct below the March 1945 production of $66,002,695. Harvesting machinery showed the greatest production drop, declining to $2,781,715 which was 47.4 pct below the March 1945 production of $5,285,045. Repair parts also showed a substantial decrease from $20,336,343 in March of last year to $11,694,507 in March 1946 or about 42.5 pct.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb. contained Be	$30.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$110.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$103 to $105
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$56.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.35
Zinc, New York	8.65
Zirconium copper, 6 pct Zr, per lb contained Zr	6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	10.00 to 10.50
Aluminum, deoxidizing No. 2, 3, 4	8.25 to 10.50
Brass ingot 85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	22.10	....	22.08
Copper, H.R.	....	18.60	....
Copper drawn	....	19.60	....
Low brass, 80%	....	21.43	20.81
High brass	....	....	21.48
Red brass, 85%	....	21.64	21.69
Naval brass	21.40	20.15	25.83
Brass, free cut	....	16.04	....
Commercial bronze, 90%	....	22.35	22.40
Commercial bronze, 95%	....	22.56	22.61
Manganese bronze	25.10	....	29.33
Phos. bronze, A, B, 5%	....	39.02	38.77
Muntz metal	21.15	19.90	24.08
Everdur, Herculoy, Olympic or equal	....	26.53	27.33
Nickel silver, 5%	....	30.80	28.62
Architect bronze	20.15	....	....

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Tubing: 2 in. OD by 0.065 in. wall: 2S-½H, 40¢; 52S-O, 61¢; 24S-T, 67.5¢; base, 2000 to 4999 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 22.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 29.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136 in. thickness: 2S, 3S, 22.7¢; 52S, 26.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 31.7¢; base, 30,000 lb and over.

Extruded Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 2S, 3S, 25.5¢; 17S, 31¢; 24S, 34¢; 53S, 28¢; 61S, 28.5¢; 63S, 26.5¢; 75S, 39¢; base 2000 to 5000 lb.

Wire, Rod and Bar—screw machine stock, rounds, 11S-T3, 17S-T, ¼ in., 28.5¢; ½ in., 26¢; 1 in., 24.5¢; 2 in., 23¢; hexagons, ¼ in., 34.5¢; ½ in., 28.5¢; 1 in., 2 in., 25.5¢; base 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam., rolled, 23.5¢; cold-finished, 24¢; base 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 37.5¢; B & S gage 13: 2S, 3S, 41.5¢; 56S, 44.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 29¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 36.5¢; base 30,000 lb.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	3.00*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	5.50[1]
Manganese bronze solids	4.50[2]
Manganese bronze borings	4.00[1]

OPA Group 4

Refinery brass	4.50*

*Price varies with analysis, [1] Lead content 0.00 to 0.40 pct. [2] Lead content 0.41 to 1.00 pct.

Brass Mill Scrap†

Briquetted cartridge brass turnings	8.625
Cartridge brass turnings, loose	7.875
Loose yellow brass trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	5.00 to 5.50
turnings, dry basis	3.50 to 4.00
Low copper alloys 51, 52, 61, 63S solids	7.00 to 8.00
turnings, dry basis	5.00 to 6.50

Plant scrap, mixed

Solids	5.25
Turnings, dry basis	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.50
Old castings and forgings	6.00
Pistons, free of struts	5.00
Pistons, with struts	4.50
Old alloy sheet	3.00 to 4.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.48
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 33¢ per lb.; 90 to 98% Ni, 23¢ per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25⅛
Electrodeposited	18⅞
Rolled, oval, straight	19⅜
Curved	20⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 pct plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80¾

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver Cyanide, 100 oz lots, per oz	0.655
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

. . . News and Market Activities

Limits Lower Tariffs On Shipyard Scrap To Four-Months' Duration

Washington

• • • **Made effective** Apr. 23, the railroads have limited to four months the life of tariffs filed with the Interstate Commerce Commission reducing to 55¢ per 100 lb from 66¢ the rate on scrap steel plate or structural scrap from the Pacific Coast to Chicago and West. This is shipyard scrap for remelting purposes which only Midwest mills have been using because of the shortage of supplies at nearby points. In cutting the rate to $12.32 per gross ton from $14.78, the carriers increased the minimum shipments to 100,000 lb except when they are made in cars of less than that capacity furnished at the carrier's convenience. The former minimum was 60,000 lb.

The proposal to slash the rate was the source of a sharp ruckus between Midwest mills and Pacific Coast scrap dealers on the one hand and Pacific Coast scrap consumers, including the Kaiser Co., Inc., Oregon Steel Mills, and the Chamber of Commerce and traffic associations, on the other hand. But after extended hearings the Interstate Commerce Commission in a decision on Apr. 10 found the reduced rate to be just and reasonable whereupon the carriers put it into effect for a four-month period. The Northwestern Steel & Wire Co., Sterling, Ill., which applied for the reduced rate, has indicated that over that period it may purchase at Pacific Coast points approximately 40,000 tons of scrap. There was no indication of the total purchases of this for western scrap by Midwest mills.

Pacific Coast steel mills contend that the reduced rate will, by reason of competitive purchases by Midwest mills, increase the price of Pacific Coast scrap, deplete the supply and curtail Pacific steel production.

Dealers say that actually in California mills are able to purchase heavy melting steel at $2 to $3 a ton under the ceiling price of $17.

•

PITTSBURGH—Supplies in this area are pretty well up to demand except for specialties such as cast grades, rail crops, etc. The major consumer in the district is laying scrap down, since operations are at very low rates. A freight embargo this week will work havoc on scrap deliveries. A prelude has been seen in railroads curtailing some fast freight service, awaiting full trainloads before moving. Dealer collections are better, with peddler collections showing definite improvement. Incoming industrial scrap is slow, mainly because steel is moving so slowly to fabricators. There are increasing numbers of rumors of overgrading.

•

CHICAGO — Further curtailment in generation of production scrap, already flowing in very small scale because of steel shortages, is inevitable because of the power conservation order restricting northern Illinois and northern Indiana industries to 24-hr operation per week. Consumption of scrap continues abnormally high because of its use to offset reduced availability of pig iron. Foundries have been unable to secure sufficient material for operations at a high rate, and several have closed. Increasing demand is focusing new attention on possibility of moving West Coast material to this district under the lower rail rate.

•

PHILADELPHIA—Openhearth scrap is relatively plentiful in this area according to mill reports although dealers still consider it on the scarce side. One eastern Pennsylvania mill is no longer accepting scrap shipments and another has closed down for vacation. Mills have reported rejections of shipments contaminated with copper and aluminum, and galvanized steel in bundles. Mills are also reporting poor preparation and oversize material. Cast scrap remains as tight as ever with foundries willing to pay as much as $7 freight.

•

DETROIT—No letup of demand was manifested in the local market this week, and as a result prices continued to hold steadily at top levels. Grades of virtually all categories continue scarce. The irregular rates of production in most automobile plants, caused by sporadic shutdowns due to labor difficulties and shortages, has resulted in keeping the flow of production scrap below normal.

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NEW YORK—The scrap trade is viewing with apprehension the effect that the railroad embargo will have on shipments of scrap. With consumer mills taking all they can get, either for immediate use or for stockpiling, and with existing supplies as meager as they are, curtailment of scrap movement would make the outlook very dark for the industry. Tightness of the market is evidenced by the spirited bidding taking place for some government scrap offerings.

BOSTON—Comes another period when supplies of most kinds of scrap have dried up and things are pretty quiet as a result. Before the current slackness, No. 1 heavy melting steel sold around $15.07 a gross ton; No. 2 heavyweight melting steel at $15.05; unprepared heavy at ceiling; and light scrap iron at about $9.80 on an aggregate turnover of some 2300 tons. Consumers are pushing yards and brokers for material without much success, and Argentina is inquiring, too.

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BUFFALO—The scrap picture was clouded this week by growing pessimism over the coal situation in general, and especially the order to curtail railroad operations. Widespread suspension of heavy industrial production is expected in the wake of rail embargoes, with scrap shipments being held up all along the line. Consumers, meanwhile, continued to place new business and all grades remained tight. Two more shiploads of 5000 tons each arrived from the lakehead, but the fuel problem may halt this activity, too. Recent wage increases have lifted the scale for common labor in yards to 80-85¢ an hr. Some yards are on a 54-hr week, giving the men "take home" pay substantially above the steel industry's 40-hr rate.

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CLEVELAND—All grades continue in extremely tight supply with prices firm at ceiling. Since May 1, more production scrap has come out than in any corresponding period since the end of the war, but other than this, there are no encouraging signs. All evidence points to a hand-to-mouth supply situation for some months to come, with many of the small foundries and small electric furnaces down to a week's supply.

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CINCINNATI—The scrap situation in this area becomes tighter daily. With pig iron supplies of foundries diminishing and shipments slow, foundries are making heavier demands for scrap, but dealers and brokers indicate that there is not sufficient material coming out to take care of the sharp increase of demand. Mills, on the other hand, are also asking for scrap and all consumers are taking all offerings.

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BIRMINGHAM — Very little No. 1 heavy melting steel is available here and the movement of strictly No. 2 heavy melting also has slowed down. Despite reductions and uncertainties in mill operations, demand for all grades of material remains strong and there has been no weakening of prices.

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TORONTO—Comparatively little change developed in the Canadian scrap iron and steel markets during the week. Scrap deliveries from the rural districts again have slowed down due to suspension of collections by farmers who are fully engaged in their farm work. Industrial scrap while appearing in somewhat better volume is well below normal and no scrap is reported from automobile wreckers. Some shipments have started from western Canada but so far only small tonnages have been involved.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut.	$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$16.00 to $16.75
No. 1 hvy. melting	16.00 to 16.75
No. 2 hvy. melting	16.00 to 16.75
No. 2 bales	14.00 to 14.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.25
No. 2 hvy. melting	13.50 to 14.25
No. 1 bales	13.50 to 14.25
No. 2 bales	12.50 to 13.25
No. 3 bales	8.00 to 9.00
Mach. shop turn.	6.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	$14.00 to 15.0
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel (cents per pound)	May 7, 1946	Apr. 30, 1946	Apr. 2, 1946	May 8, 1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.65
Hot-rolled strip				
6 in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.20
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.25	$5.25	$5.25	$5.00
Tinplate, electro (0.50 lb)	4.75	4.75	4.75	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.50	2.50	2.50	2.15
Cold-finished bars	3.10	3.10	3.10	2.65
Alloy bars	2.808	2.808	2.808	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.76	4.76	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.05	3.05	3.05	2.60
Wire nails	3.25	3.25	3.25	2.80
Rails: (dollars per net ton)				
Heavy rails	$43.39	$43.39	$43.39	$43.00
Light rails	49.18	49.18	49.18	43.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$39.00	$39.00	$39.00	$34.00
Sheet bars	38.00	38.00	38.00	34.00
Slabs, rerolling	39.00	39.00	39.00	34.00
Forging billets	47.00	47.00	47.00	40.00
Alloy blooms, billets, slabs	56.16	56.16	56.16	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.30	2.30	2.30	2.00
Skelp	2.05	2.05	2.05	1.90

Pig Iron: (per gross ton)	May 7, 1946	Apr. 30, 1946	Apr. 2, 1946	May 8, 1945
No. 2 foundry, Phila.	$28.34	$28.34	$28.34	$26.84
No. 2, Valley furnace	26.50	26.50	26.50	25.00
No. 2, Southern, Cin'ti	26.94	26.94	26.94	25.44
No. 2, Birmingham	22.88	22.88	22.88	21.38
No. 2 foundry, Chicago†	26.50	26.50	26.50	25.00
Basic, del'd eastern Pa.	27.84	27.84	27.84	26.34
Basic, Valley furnace	26.00	26.00	26.00	24.50
Malleable, Chicago†	26.50	26.50	26.50	25.00
Malleable, Valley	26.50	26.50	26.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	**18.75**	**18.75**	**18.75**	**18.75**
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of **Apr. 22, 1943**, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the **Apr. 22, 1943**, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
May 7, 1946	2.69516¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One week ago	2.69516¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One month ago	2.69516¢ per lb.	$26.12 per gross ton	$19.17 per gross ton
One year ago	2.42471¢ per lb.	$24.61 per gross ton	$19.17 per gross ton

	HIGH			LOW		
1946	2.69516¢	Feb.	19	2.44104¢	Jan.	1
1945	2.44104¢	Oct.	2	2.38444¢	Jan.	2
1944	2.30837¢	Sept.	5	2.21189¢	Oct.	5
1943	2.29176¢			2.29176¢		
1942	2.28249¢			2.28249¢		
1941	2.43078¢			2.43078¢		
1940	2.30467¢	Jan.	2	2.24107¢	Apr.	16
1939	2.35367¢	Jan.	3	2.26689¢	May	16
1938	2.58414¢	Jan.	4	2.27207¢	Oct.	18
1937	2.58414¢	Mar.	9	2.32263¢	Jan.	4
1936	2.32263¢	Dec.	28	2.05200¢	Mar.	10
1935	2.07642¢	Oct.	1	2.06492¢	Jan.	8
1934	2.15367¢	Apr.	24	1.95757¢	Jan.	2
1933	1.95578¢	Oct.	3	1.75836¢	May	2
1932	1.89196¢	July	5	1.83901¢	Mar.	1
1931	1.99626¢	Jan.	13	1.86586¢	Dec.	29
1930	2.25488¢	Jan.	7	1.97319¢	Dec.	9
1929	2.31773¢	May	28	2.26498¢	Oct.	29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

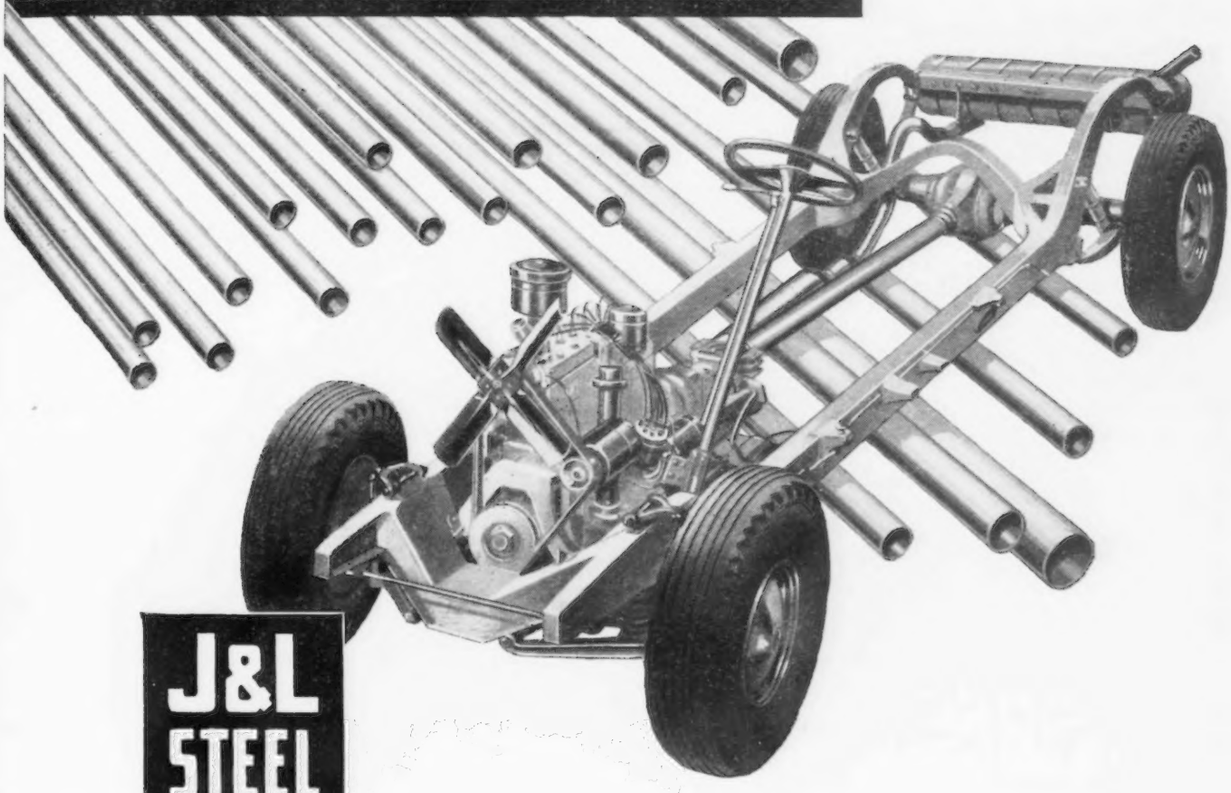
HIGH		LOW	
$26.12	Mar. 19	$25.37	Jan. 1
25.37	Oct. 23	23.61	Jan. 2
$23.61		$23.61	
23.61		23.61	
23.61		23.61	
$23.61	Mar. 20	$23.45	Jan. 2
23.45	Dec. 23	22.61	Jan. 2
22.61	Sept. 19	20.61	Sept. 12
23.25	June 21	19.61	July 6
23.25	Mar. 9	20.25	Feb. 16
19.74	Nov. 24	18.73	Aug. 11
18.84	Nov. 5	17.83	May 14
17.90	May 1	16.90	Jan. 27
16.90	Dec. 5	13.56	Jan. 3
14.81	Jan. 5	13.56	Dec. 6
15.90	Jan. 6	14.79	Dec. 15
18.21	Jan. 7	15.90	Dec. 16
18.71	May 14	18.21	Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH		LOW	
$19.17		$19.17	
$19.17	Jan. 2	$18.92	May 22
19.17	Jan. 11	15.76	Oct. 24
$19.17		$19.17	
19.17		19.17	
$22.00	Jan. 7	$19.17	Apr. 10
21.83	Dec. 30	16.04	Apr. 9
22.50	Oct. 3	14.08	May 16
15.00	Nov. 22	11.00	June 7
21.92	Mar. 30	12.67	June 9
17.75	Dec. 21	12.67	June 8
13.42	Dec. 10	10.33	Apr. 29
13.00	Mar. 13	9.50	Sept. 25
12.25	Aug. 8	6.75	Jan. 3
8.50	Jan. 12	6.43	July 5
11.33	Jan. 6	8.50	Dec. 29
15.00	Feb. 18	11.25	Dec. 9
17.58	Jan. 29	14.08	Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

FOR STRONG, LIGHTWEIGHT PARTS IN AUTOMOBILES AND MACHINERY USE J&L ELECTRICWELD TUBING



J&L STEEL

Weight reduction without sacrificing strength is possible in your products through use of J&L Electricweld Tubing. Many design engineers have discovered the economy of specifying J&L tubing for supporting members as well as for use in machine parts and formed sections. They also specify tubing for parts under dynamic loading for it will carry more load than any other section of the same weight. Write today for further information.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($33.00 f. o. b. mill)														
Carbon, forging	$38	$38	$38	$38	$38	$38	$38								
Alloy	$46.80	$46.80				$46.80	(Bethlehem, Massillon, Canton, Coatesville=$46.80)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$39	$39	$39	$39	$39	$39	(Provo=$50.20, Duluth=$41[14]) $39	$39				$51[14]	$41		
Carbon, forging billets	$47	$47	$47	$47	$47	$47	(Provo=$58.20, Duluth=$49[14]) $47					$59[14]	$49		
Alloy	$56.16	$56.16				$56.16	(Bethlehem, Massillon, Canton=$56.16)						$61		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]															
No. 5 to 9/32 in.	2.30¢	2.30¢		2.30¢	2.30¢		(Worcester=2.40¢)				2.55¢	2.80¢			
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.665¢	2.595¢
Cold-rolled [1]	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.595¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.29¢	4.22¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.16¢	4.12¢
Long ternes [2]	4.05¢	4.05¢	4.05¢									4.80¢		4.41¢	4.37¢
STRIP															
Hot-rolled [3] 6 in. and under	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢		2.45¢			2.45¢		3.10¢	2.55¢	2.81¢	2.77¢
Hot-rolled [3] over 6 in.	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢		2.35¢			2.35¢		3.00¢	2.45¢	2.71¢	2.67¢
Cold-rolled [4]	3.05¢	3.15¢		3.05¢			3.05¢	(Worcester=3.25¢)					3.15¢	3.41¢	3.37¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.91¢	
Commodity cold-rolled	3.20¢	3.30¢		3.20¢			3.20¢	(Worcester=3.60¢)					3.30¢	3.56¢	
TINPLATE															
Standard cokes, base box	$5.25	$5.25	$5.25		$5.35			$5.35	$5.35					$5.60[11]	$5.53[11]
Electro, box 0.25 lb	$4.60	$4.60	$4.60					$4.70							
Electro, box 0.50 lb	$4.75	$4.75	$4.75					$4.85	$4.85						
Electro, box 0.75 lb	$4.90		$4.90					$5.00	$5.00						
BLACKPLATE															
29 gage [5]	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢						3.57¢
TERNES, MFG.															
Special coated, base box	$4.55	$4.55	$4.55					$4.65	$4.65						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	(Duluth=2.60¢) (Provo, Utah=3.20¢)			2.85¢	3.15¢	2.60¢	2.84¢	2.82¢
Rail steel [6]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.59¢	2.67¢
Reinforcing (rail) [7]	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		2.57¢
Cold-finished [8]	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢	(Detroit=3.15¢) (Toledo=3.25¢)							3.44¢	3.42¢
Alloy, hot-rolled	2.808¢	2.808¢				2.808¢	2.808¢	(Bethlehem Massillon, Canton=2.808¢)					2.908¢		
Alloy, cold-drawn	3.484¢	3.484¢	3.484¢	3.484¢		3.484¢							3.584¢		
PLATE								(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)							
Carbon steel [13]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢			2.85¢	3.05¢	2.72¢	2.69¢	2.55¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.11¢	4.07¢
Alloy	3.64¢	3.64¢			(Coatesville=3.64¢)						4.108¢	4.316¢		3.64¢	3.73¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢	(Bethlehem=2.35¢)				2.60¢	3.00¢		2.52¢	2.465¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢			(Worcester=3.25¢)								
0.51 to 0.75 carbon	4.65¢			4.65¢			(Worcester=4.85¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	9.03¢			9.03¢			(Worcester=9.23¢)								
WIRE [9]															
Bright [12]	3.05¢	3.05¢		3.05¢	3.05¢		(Worcester=3.15¢) (Duluth=3.10¢)					3.55¢			3.37¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	3.65¢	3.65¢		3.65¢			(Worcester=3.75¢)					4.15¢			3.97¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢			2.97¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	$43.39
Angle splice bars, 100 lb	2.35
(F.o.b. basing points)	*per net ton*
Light rails (from billets)	$49.18
Light rails (from rail steel)	48.29
	base per lb
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.72*	19.76
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	$3.25	$3.75
Coated nails	3.25	3.75
Cut nails, carloads	3.85	....
	base per 100 lb	
Annealed fence wire	$3.50	$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbless wire	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$8.50	$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
NE 8600	0.676¢	$13.52	1.196¢	$23.92
NE 8700	0.728	14.56	1.248	24.96
NE 9400	0.780	15.60	1.300	26.00
NE 9700	0.676	13.52	1.196	23.92
NE 9800	1.352	27.04	1.872	37.44
NE 9900	1.248	24.96	1.612	32.24

The extras shown are in addition to the base price of $2.808 per 100 lb on finished products and $56.16 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.26¢ per lb for bars and bar-strip and $5.20 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

Steel (buttweld)

	Black	Galv.
⅛-in.	60½	48
¼-in.	63½	52
1-in. to 3-in.	65½	54½

Wrought Iron (buttweld)

⅛-in.	18	+4
¼-in.	24	2½
1-in. and 1¼-in.	28½	9
1½-in.	33	12
2-in.	32	11

Steel (lapweld)

2-in.	58	46½
2½-in. and 3-in.	61	49½
3½-in. to 6-in.	63	51½

Wrought Iron (lapweld)

2-in.	25	4½
2½-in. to 3½-in.	26	7
4-in.	28	11
4½-in. to 8-in.	27	10

Steel (butt, extra strong, plain ends)

⅛-in.	58½	47½
¼-in.	62½	51½
1-in. to 3-in.	64	54

Wrought Iron (same as above)

⅛-in.	19	+1½
¼-in.	25	4½
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45½
2½-in. and 3-in.	60	49½
3½-in. to 6-in.	63½	53

Wrought Iron (same as above)

2-in.	28	8½
2½-in. to 4-in.	34	16
4½-in. to 6-in.	32	14½

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled	Lapweld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2½ in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3½ in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....$60.80
6-in. and larger, del'd New York... 60.20
6-in. and larger, Birmingham..... 52.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle 74.00

For all rail shipment; rail and water shipment less.

Class "A" and gas pipe, $3 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 7 pct applies to all listings.

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1¼ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 pct additional discount.

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	Consumer Percent Off List
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	61

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25¼¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, Byproduct	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.25
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.30
Cincinnati, del'd	13.25
St. Louis, del'd	13.75†
Birmingham, del'd	10.90

*Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick*	Per 1000
Super-Duty brick, St. Louis	$76.05
First quality, Pa., Md., Ky., Mo., Ill.	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	57.70
No. 1 Ohio	50.00
Ground fire clay, net ton	8.95

Silica Brick*	
Pennsylvania and Birmingham	$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)	10.60

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. in bulk	22.00
in sacks	26.00

*Retroactive to Apr. 1.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.95
Old range, non-bessemer, 51.50	4.80
Mesaba, bessemer, 51.50	4.70
Mesaba, non-bessemer, 51.50	4.55
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
				Hot-Rolled										
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	6 In. and Under	Over 6 in.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, NE 8617-20	Hot-Rolled, NE 8742-50 Ann.	Cold-Drawn, NE 8617-20	Cold-Drawn, NE 8742-50 Ann.
**Philadelphia	$3.743	$5.097	$5.218a	$4.272	$4.172	$5.022	$3.855	$3.916	$4.072	$4.522	$6.016	$7.216	$7.372	$8.522
New York	3.815	4.838[3]	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston	3.999	4.969[9]	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore	3.619	5.077	5.344	4.252	4.152	....	3.844	4.009	4.052	4.502	....	....	....	....
Norfolk	3.996	....	5.821	4.515	4.415	....	4.221	4.252	4.315	4.615	....	....	....	....
Chicago	3.475	4.425	5.581	3.95	3.85	4.90[17]	3.80	3.80	3.75	4.20	....	....	....	....
Milwaukee	3.612	4.562[3]	5.537	4.087	4.077	5.037[17]	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland	3.575	4.625	5.327	3.95	3.85	4.70[17]	3.65	3.838	3.60	4.20	6.006	....	6.95	....
Buffalo	3.575	4.625	5.104	4.169	4.069	4.919	3.88	3.65	3.60	4.20	5.80	6.90	7.95	8.00
Detroit	3.675	4.725	5.45	4.05	3.95	....	3.859	3.911	3.70	4.25	6.13	....	7.259	....
Cincinnati	3.65	4.70[3]	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	....	7.311	....
St. Louis	3.622	4.572[3]	5.581	4.097	3.997	5.181[17]	3.947	3.947	3.897	4.481	6.181	....	7.331	....
Pittsburgh	....	....	....	....	....	....	....	....	....	4.20	....	....	....	....
St. Paul	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha	4.018	5.668	5.965	4.343	4.243	....	4.343	....	4.293	4.893	....	....	....	....
Indianapolis	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	....	7.28	....
Birmingham	3.675	....	5.20	....	....	....	3.80	3.80	3.75	4.903	....	....	....	....
Memphis	4.19	4.985	5.715	4.565	4.465	....	4.315	4.315	4.265	4.78	....	....	....	....
New Orleans	4.283*	5.304	5.808	4.658	4.558	....	4.408	4.408*	4.358*	5.079	....	....	....	....
Houston	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Los Angeles	5.00	7.20[3]	....	4.95	4.85	....	4.95	4.65	4.40	5.683	....	....	....	....
San Francisco	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Seattle	4.87[12]	7.27[4]	6.40	4.60	4.50	....	5.00[12]	4.70[12]	4.60[12]	6.23	....	....	....	....
Portland	4.87[11]	6.82[4]	6.20	5.10	5.00	....	5.00[11]	4.70[11]	4.70[11]	5.98	8.15	....	9.20	....
Salt Lake City	....	....	....	....	....	....	....	....	....	....	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12)) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, effective Mar. 15, 1946.
Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	27.00	27.50	28.00	28.50	.....	Boston	Everett	0.50	27.50	28.00	28.50	29.00	.....
Birdsboro	27.00	27.50	28.00	28.50	32.00	Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	36.02
Birmingham	21.50	22.88	.....	27.50	.....	Brooklyn	Bethlehem	2.50	29.50	30.00	30.50	31.00	.....
Buffalo	25.50	26.50	27.00	27.50	32.00	Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	34.92
Chicago	26.00	26.50	26.50	27.00	.....	Canton	Clev, Ygstn, Sharpsvil.	1.39	27.39	27.89	27.89	28.39	.....
Cleveland	26.00	26.50	26.50	27.00	.....	Canton	Buffalo	3.19	.....	.....	.....	.....	35.19
Detroit	26.00	26.50	26.50	27.00	.....	Cincinnati	Birmingham	4.06	25.56	26.94	.....	.....	.....
Duluth	26.50	27.00	27.00	27.50	.....	Cincinnati	Hamilton	1.11	.....	.....	27.61	.....	.....
Erie	26.00	26.50	27.00	27.50	.....	Cincinnati	Buffalo	4.40	.....	.....	.....	.....	36.40
Everett	27.00	27.50	28.00	28.50	.....	Jersey City	Bethlehem	1.53	28.53	29.03	29.53	30.03	.....
Granite City	26.00	26.50	26.50	27.00	.....	Jersey City	Birdsboro	1.94	.....	.....	.....	.....	33.94
Hamilton	26.00	26.50	26.50	.....	.....	Los Angeles	Provo	4.95	28.95	29.45	.....	.....	.....
Neville Island	26.00	26.50	26.50	27.00	.....	Los Angeles	Buffalo	15.41	.....	.....	.....	.....	47.41
Provo	24.00	24.50	.....	.....	.....	Mansfield	Cleveland-Toledo	1.94	27.94	28.44	28.44	28.94	.....
Sharpsville[1]	26.00	26.50	26.50	27.00	.....	Mansfield	Buffalo	3.36	.....	.....	.....	.....	35.36
Sparrows Point	27.00	27.50	.....	.....	.....	Philadelphia	Swedeland	0.84	27.84	28.34	28.84	29.34	.....
Steelton	27.00	.....	.....	.....	32.00	Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	33.24
Swedeland	27.00	27.50	28.00	28.50	.....	San Francisco	Provo	4.95	28.95	29.45	.....	.....	.....
Toledo	26.00	26.50	26.50	27.00	.....	San Francisco	Buffalo	15.41	.....	.....	.....	.....	47.41
Youngstown	26.00	26.50	26.50	27.00	.....	Seattle	Provo	4.95	28.95	29.45	.....	.....	.....
						Seattle	Buffalo	15.41	.....	.....	.....	.....	47.41
						St. Louis	Granite City	0.50	26.50	27.00	27.00	27.50	.....
						St. Louis	Buffalo	7.07	.....	.....	.....	.....	39.07

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorous content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 8, 1943, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$32.00; f.o.b. Buffalo—$33.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.05¢	6.30¢	6.60¢
Ton lots	6.65¢	7.55¢	8.55¢
Less ton lots	6.80¢	7.80¢	8.80¢

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed.

96-98% Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30¢
L.c.l. lots	32¢

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	34¢
Ton lots	36¢
Less ton lots	38¢

Low-Carbon Ferromanganese

Contract price per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00¢	21.40¢	21.65¢
0.10% max. C	20.50¢	20.90¢	21.15¢
0.15% max. C	20.00¢	20.40¢	20.65¢
0.30% max. C	19.50¢	19.90¢	20.15¢
0.50% max. C	19.00¢	19.40¢	19.65¢
0.75% max. C, 7.00% max. Si	16.00¢	16.40¢	16.65¢

Silicomanganese

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05¢
Ton lots	6.70¢
Briquet, contract basis, carlots, bulk, freight allowed, per lb. of briquet	5.80¢
Ton lots	6.30¢
Less ton lots	6.55¢

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $48.75 f.o.b. Keokuk, Iowa; $46.75 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

Contract price per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10¢	13.55¢	16.50¢
97% Si, 1% Fe	13.45¢	13.90¢	16.80¢

Ferrosilicon Briquets

Contract price per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination. 40% Si.

	Eastern	Central	Western
Carload, bulk	3.35¢	3.50¢	3.65¢
Ton lots	3.80¢	4.20¢	4.25¢

Electric Ferrosilicon

Contract price per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	6.65¢	7.10¢	7.25¢
75% Si	8.05¢	8.20¢	8.75¢
80-90% Si	8.90¢	9.05¢	9.55¢
90-95% Si	11.05¢	11.20¢	11.65¢

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00¢	23.40¢	24.00¢
0.10% C	22.50¢	22.90¢	23.50¢
0.15% C	22.00¢	22.40¢	23.00¢
0.20% C	21.50¢	21.90¢	22.50¢
0.50% C	21.00¢	21.40¢	22.00¢
1.00% C	20.50¢	20.90¢	21.50¢
2.00% C	19.50¢	19.90¢	20.50¢
66-71% Cr, 4-10% C	13.00¢	13.40¢	14.00¢
62-66% Cr, 5-7% C	13.50¢	13.90¢	14.50¢

Briquets—contract price per pound of briquet, f.o.b. shipping point, freight allowed. 60% chromium.

	Eastern	Central	Western
Carload, bulk	8.25¢	8.55¢	8.95¢
Ton lots	8.75¢	9.25¢	10.75¢
Less ton lots	9.00¢	9.50¢	11.00¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	14.00	14.40	15.00
Ton lots	14.90	15.55	16.75
Less ton lots	15.40	16.05	17.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25 max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices per pound, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot	45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50¢	16.00¢	18.05¢
Ton lots	16.50¢	17.35¢	19.10¢
Less ton lots	17.00¢	17.85¢	19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.35	$1.75	$4.25
Less ton lots	1.60	2.00	5.00

CMSZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.			
Ton lots	12.00¢	12.75¢	14.75¢
Less ton lots	12.50¢	13.25¢	15.25¢
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.			
Ton lots	11.75¢	12.50¢	14.50¢
Less ton lots	12.25¢	13.00¢	15.00¢

SMZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00¢	12.85¢	14.60¢
Less ton lots	12.50¢	13.35¢	15.10¢

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V...	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.25
Less ton lots	$2.30
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45¢, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Sigio), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.	
Car lots	8.00¢
Ton lots	8.75¢
Less ton lots	9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	25¢
Ton lots	26¢
Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	58¢
Ton lots	59¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

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British Developments In Powder Metallurgy Technique Reviewed

New York

• • • **A review of British powder** metallurgy was presented by Dr. W. D. Jones, well-known English powder metallurgist, at the Stevens Institute of Technology, Hoboken, N. J., Apr. 24. Dr. Jones was also awarded the Institute's second annual medal for outstanding achievement in the field of powder metallurgy.

DR. JONES

Dr. Jones frankly admitted the lack of interest in the field of powder metallurgy in England subsequent to early work done by W. H. Wollaston and Henry Bessemer. He reviewed the contributions of these two pioneers to the industry. Developments in the tungsten wire industry, metal carbides and porous bronze bearings, between 1920 and 1930, tended to renew British interest.

Up to the outbreak of the World War, England manufactured very few powders, drawing most of the iron, copper and alloy powders from the United States, Germany and Sweden. During the war, of course, this supply was cut off, so that production of articles from metal powders suffered severely. Military necessity limited production to manufacture of porous bronze bearings, carbide materials for carbide bullet cores, 50 pct aluminum-50 pct magnesium powders for incendiary bullets and bombs, and magnetic alloys for the armed forces.

One of the most important developments has been the manufacture of deicing strips for aircraft. The porous, copper-nickel strip, into which is injected a deicing fluid, is placed along the leading edge of the aircraft. The fluid can then be forced to emerge along the wing as required.

Dr. Jones predicted the development of powder metallurgy along three lines: (1) Handling of the primary raw materials, which he stated is not for England, but for

(CONTINUED ON PAGE 148)

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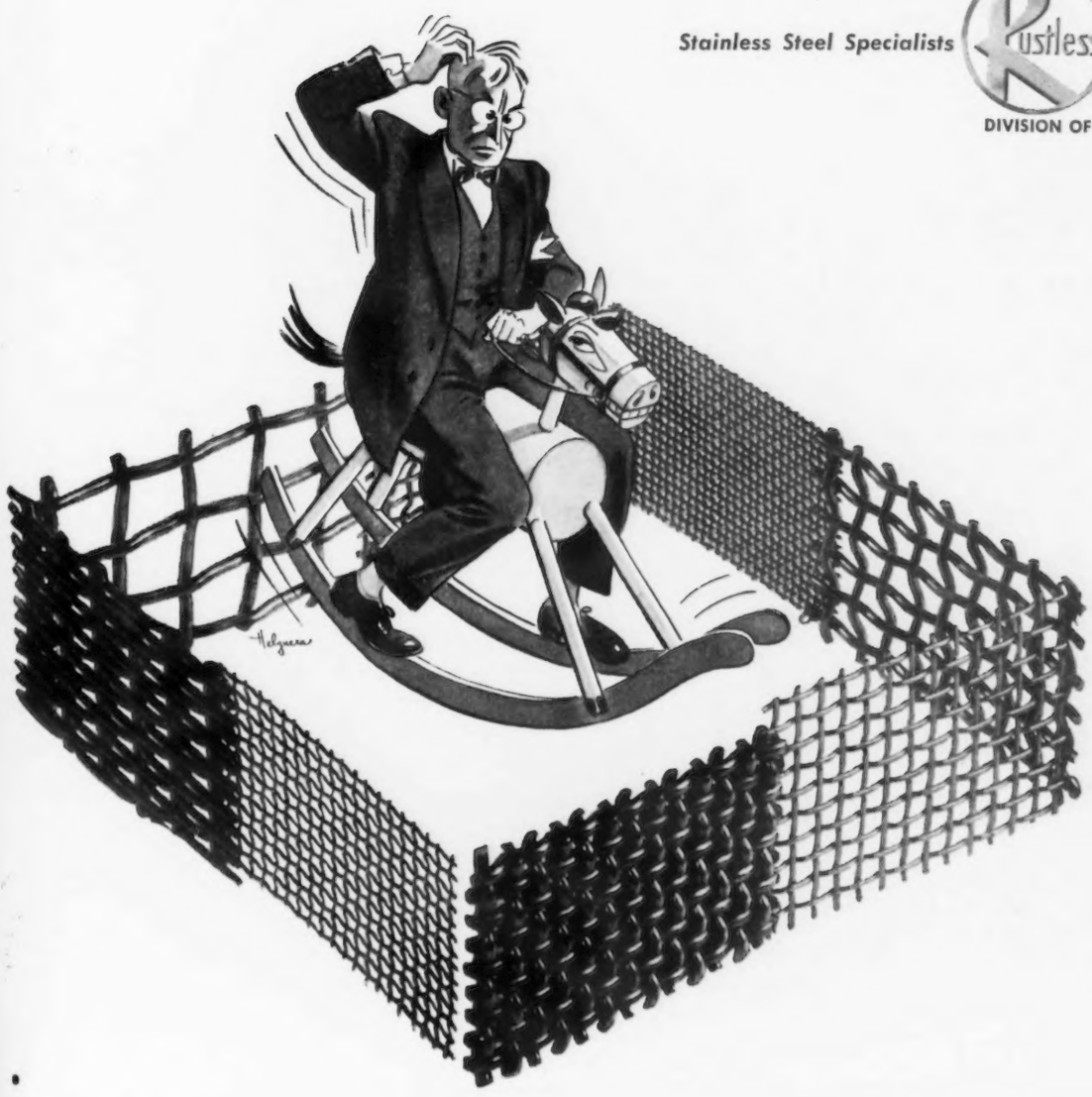

(CONTINUED FROM PAGE 146)

the United States; (2) manufacture of shaped components, in competition with die casting, forging, casting, etc.; and (3) production of articles possessing physical properties that cannot be duplicated by competing processes. The third point is enhanced by the fact that powder metallurgy is not limited by any phase rule, as is casting, and hence countless numbers of metal combinations are possible.

H. J. Blair Made Head Of Culvert Association

Cleveland

• • • **A three-day meeting** of the Toncan Culvert Manufacturers Assn. ended here Apr. 17 with the election of Harold J. Blair, president of Empire State Culvert Corp., Groton, N. Y., as president of the association, for the coming year.

MR. BLAIR

The association is composed of representatives of fabricating companies who use Toncan iron, a product of Republic Steel Corp. in building culverts and other drainage products.

O. H. Miller, president of Choctaw, Inc., Memphis, Tenn., was elected vice president of the association, and N. J. Thompson, sales manager of Thompson Pipe & Steel Co., Denver, secretary and treasurer.

Twenty members of the association and representatives of Republic Steel attended the meeting, principal matters discussed being problems of current production and the development of new drainage products to meet the anticipated demand of highway and airport construction. A special committee to study the product development was appointed, headed by R. W. Langenbach, president, Berger Metal Culvert Co., Somerville, Mass. Others on the committee are: Glen Busbee, Wisconsin Culvert Co., Madison; T. F. de Capiteau, drainage produce engineer, Republic Steel Corp., Cleveland; Darrell Blake, Eaton Metal Products Corp., Omaha, and Mr. Thompson.

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Foremen Unionization Encouraged by NLRB, Says Foremen's League

Pittsburgh

• • • **The pattern of** a country-wide drive for the unionization of foremen emerged with the revelation by the Foremen's League that 18 National Labor Relations Board decisions in the past 30 days gave bargaining rights to supervisory employees.

Since the board's decision in the Jones & Laughlin vs. UMW case on Mar. 9, the NLRB has opened the floodgates to the unionization of "management." In addition to the 17 pro-union decisions, two additional certifications have been made and a number of union petitions are pending. Members of the NLRB are: Paul Herzog, chairman; John Houston and Gerard Reilly.

"This is additional invitation to anarchy in the American industrial system," William Adams Littell, executive secretary of the Foremen's League, said. "It is obvious that what is happening is the circumvention of the will of Congress as expressed in the Wagner Labor Act. It was never the intent of Congress to include supervisers among 'employees' covered by the Wagner Act. The NLRB admitted this in its first rulings. Now, by numerous decisions, dangerous inroads are being made into the province of management."

The following 17 cases have been decided in favor of unions and released by the NLRB since the J&L Steel Corp. case, Mar. 7:

American Smelting and Refining Co., Perth Amboy, N. J., Mar. 8, salaried foremen, assistant general foremen and non-working assistant foremen. Independent union. No dissent.

Celotex Corp., Marreco, La., Mar. 8, general foremen, foremen, and assistant foremen. Independent union. No dissent.

Kelsey-Hayes Wheel Co., Detroit, Mar. 11, general foremen, assistant general foremen, and comparable supervisors in one unit. Department foremen, section foremen, and comparable supervisors in a second unit. Foremen's Assn. of America. Reilly dissented.

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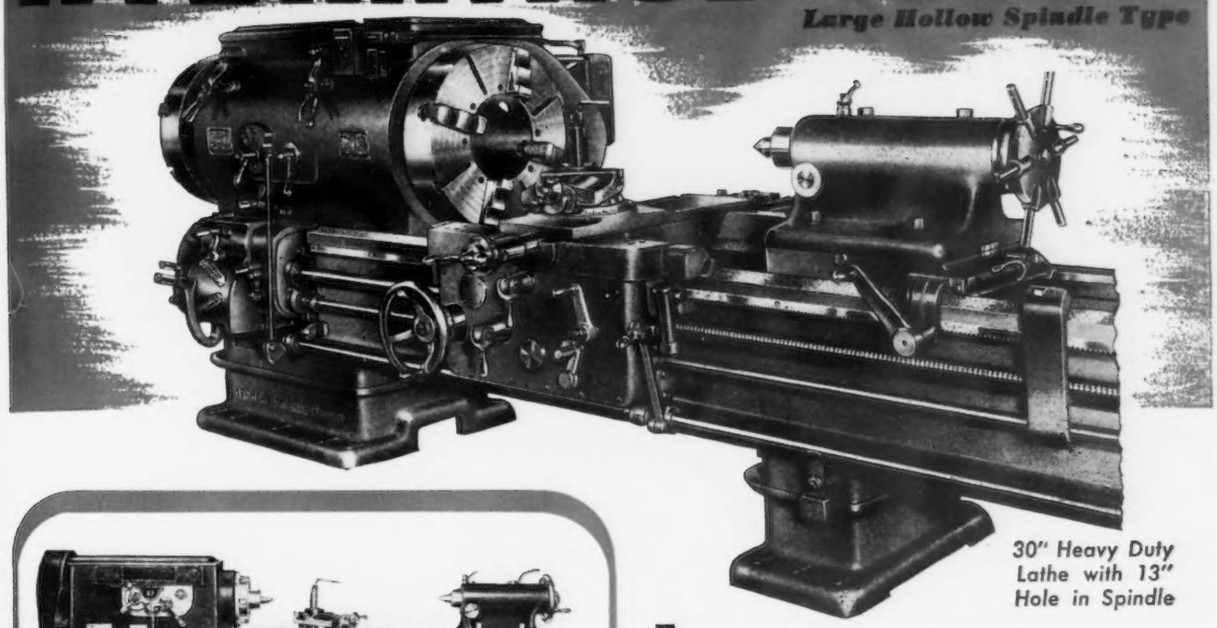
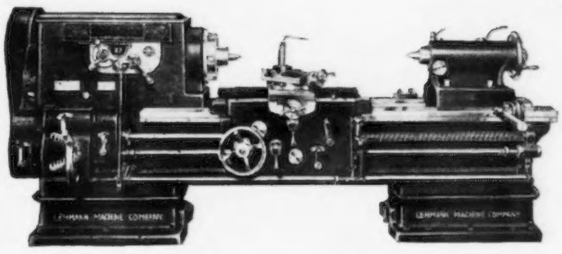


30" Heavy Duty Lathe with 13" Hole in Spindle



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The big 27" size, shown above, has all the ruggedness and power for the heaviest possible work. And its many refinements in design and construction result in an ease of operation comparable to small machines.

In hundreds of plants—under all sorts of conditions—LEHMANN HYDRATROL LATHES have invariably brought about faster production, better work, lower costs.

Look around your own shop—you may find a number of machining jobs which possibly could be done better on a Large Hollow Spindle Type of HYDRATROL LATHE. Send us prints of these unusual, difficult, or too-costly machining jobs, for a specific, time-and-money-saving recommendation.

Five Sizes - 18" to 36"

Small	**18" up to 7 1/4" Hole**
Medium	**24" up to 12" Hole**
Large	**27" up to 13" Hole**
Large	**30" up to 14" Hole**
Large	**36" up to 16 1/2" Hole**

(Standard type lathes, 16" to 36")

Lehmann MACHINE COMPANY

CHOUTEAU AT GRAND • • • ST. LOUIS 3, MISSOURI

Corp., Toledo, Ohio, Mar. 14, supervisors and foremen. Foremen's Assn. of America. Reilly dissented.

Fireboard Products, Inc., Los Angeles, Mar. 12, first line supervisors. FAA. No dissent.

Federal Mogul Corp., Detroit, Mar. 11, assistant foremen, foremen, and general foremen, FAA. No dissent.

Heyden Chemical Corp., Fords, N. J., Mar. 15, all foremen, including chief engineer and chief electrician, but excluding working foremen. FAA. Reilly dissented.

Ludlow Typograph Co., Chicago, Mar. 21, foremen, assistant foremen, and foreladies. FAA. Reilly dissents.

Allied Steel Castings Co., Chicago, Mar. 21, superintendents, job foremen, and assistant foremen. FAA. Reilly dissented.

Columbia Machine Works, Inc., Brooklyn, Mar. 21, foremen and assistant foremen. Independent union. Reilly dissented.

Westinghouse Electric Corp., Springfield, Mass., Mar. 28, foremen, assistant division staff supervisors, assistant general foremen, and staff general foremen. FAA. Reilly dissented.

Curtis Bay Towing Co. of Pennsylvania, Mar. 25, masters and mates of tugboats. Contest here was between United Mine Workers of America, District 50, and National Assn. of Masters, Mates, and Pilots. Reilly dissented.

Worthington Pump and Machinery Corp., Holyoke, Mass., Mar. 28, time study and standards employees. Independent union. No dissent.

Armour & Co., Syracuse, N. Y., Mar. 29, plant employees, including processing foremen. United Packing Workers of America, CIO. No dissent.

Essex Wire Corp., Highland Park, Mich., Mar. 29, supervisory employees in production, inspection and maintenance depts., and chief inspectors. FAA. Reilly dissented.

Auto-Lite Battery Corp., Syracuse (Owen-Dynito Div.), Mar. 25, foremen and assistant foremen. FAA. Reilly dissented.

Wilson & Co., Inc., Chicago, Mar. 29, general foremen, assistant general foremen, foremen, and assistant foremen. FAA. Reilly dissented.

California Packing Corp., Ya-

kima, Wash., Apr. 7, supervisory employees and foremen. Fruit and Vegetable Packers and Warehousemen's Union, an auxiliary of the Teamsters Union (AFL). Reilly dissented.

Harry P. Jeffrey of Dayton, Ohio, national counsel for the Foremen's League, said, "The CIO, the UMW, the AFL and independent unions are now converging on the NLRB, confident that they will get favorable decisions. There is a wild and wide scramble to pressure the nation's two million foremen into labor unions."

Mr. Jeffrey pointed out that the NLRB's decision in the California Packing Corp. case, announced Apr. 7, "completes the cycle." In the Packard Motor Car decision last year, the NLRB ruled that foremen could organize in independent unions. In the Jones & Laughlin case it ruled that they could join rank and file unions. Now, in the California Packing Corp. case, it rules that foremen can join affiliate or auxiliary unions which are parts of big labor organizations.

"The minority believes that it was never the intent of Congress to include such supervisors among employees covered by the Wagner Act, and even the National Labor Relations Board at first so held. The amendment is made necessary by a number of recent 2-to-1 decisions of the NLRB interpreting the act as requiring employers to bargain collectively regarding such supervisors even when they are included in the same union as production employees whom they supervise for the employer.

ICC Assures Lower Rates

• • • **Lower railroad** rates on shipment of steel products from Atlanta, Ga., to the Pacific Coast were assured recently by Interstate Commerce Commission order under docket number 29048 following a complaint filed by the Atlantic Steel Co.

The railroads were ordered to publish by July 17 new rates by which the Atlanta-West Coast carload tariff would not exceed $1.19 per 100 lb on domestic traffic nor exceed rates in effect from Birmingham and Alabama City, Ala., to the same destination by more nor more than 9¢ per 100 lb on dothan 5¢ per 100 lb on export traffic, mestic shipments.

Chapters of American Steel Warehouse Assn. Elect New Officers

Cleveland

• • • **The following** chapters of the American Steel Warehouse Assn., Inc., have elected officers for the coming year, Walter S. Doxsey, president of the association, announces:

Central States Chapter

President, F. C. Flosi, A. M. Castle & Co., Chicago; vice-president, A. E. Kuby, Standard Steel & Wire Corp., Chicago, vice-president, A. J. Tanck, National Steel Co., Chicago; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer, D. F. Grace, Chicago Steel Service Co., Chicago; chapter director, H. V. Douglas, Central Steel & Wire Co., Chicago.

Cincinnati Chapter

President, J. E. Merchant, Edgar T. Ward's Sons Co., Cincinnati; vice-president, John A. Thiele, Miami-Dickerson Steel Co., Dayton; vice-president, William A. Kruse, Jr., Union Iron & Steel Co., Cincinnati; secretary, Wayne Dukette, Joseph T. Ryerson & Son, Inc., Cincinnati; treasurer, F. E. Morris, E. K. Morris & Co., Inc., Cincinnati; chapter director, John A. Thiele, Miami-Dickerson Steel Co., Dayton.

Colorado Chapter

President, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver; vice-president, J. H. Singleton, C. A. Crosta, Inc., Denver; secretary-treasurer, A. M. Hays, Hendrie & Bolthoff Mfg. & Supply Co., Denver; chapter director, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver.

Connecticut Chapter

President, R. B. Shearer, The C. S. Mersick & Co., New Haven, Conn.; vice-president, S. H. Hascall, The Blodgett & Clapp Co., Hartford, Conn.; secretary-treasurer, G. S. Brousso, The C. S. Mersick & Co., New Haven, Conn.; chapter director, R. B. Shearer, The C. S. Mersick & Co., New Haven, Conn.

Detroit Chapter

President, T. L. Parker, Edgar T. Ward's Sons Co., Detroit; secretary-treasurer, V. R. Bates, Craine

Schrage Steel Div., Detroit Steel Corp., Detroit; chapter director, J. Ivan Fiscus, Huron Steel Co., Inc., Detroit.

Intermountain Chapter

President, H. P. Lambrecht, The Salt Lake Hardware Co., Salt Lake City; vice-president, L. S. Packman, Steel-Engineers Co., Salt Lake City; secretary-treasurer, H. C. Kimball, Z.C.M.I. Wholesale Hardware Div., Salt Lake City; chapter director, H. P. Lambrecht, The Salt Lake Hardware Co., Salt Lake City.

New England Chapter

President, Frederick H. Lovejoy, Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.; first vice-president, James A. Parsons, Ward Steel Co., Boston; second vice-president, Verdi A. Dodds, Brown-Wales Co., Boston; secretary-treasurer, Carroll S. Harvey, Arthur C. Harvey Co., Boston; chapter director, Everett F. Merrill, Merrill & Usher Co., Worcester, Mass.

Northern California

President, Paul M. Oakley, Geo. R. Borrmann Steel Co., Oakland, Calif.; vice-president, James D. Tayler, Tayler & Spotswood Co., San Francisco; vice-president, Wakefield Baker, Baker & Hamilton, San Francisco; secretary, Lyle Kindorf, Gilmore Steel & Supply Co., San Francisco; chapter director, Paul M. Oakley, Geo. R. Borrmann Steel Co., Oakland, Calif.

Northern Ohio

President, W. S. Bidle, SAE Steels, Cleveland; vice-president, J. W. Reichert, The Decker-Reichert Steel Co., Cleveland; secretary-treasurer, W. O. Springer, Joseph T. Ryerson & Son, Inc., Cleveland; chapter director, R. J. Foster, Republic Structural Iron Works, Cleveland.

Pacific Northwest

President, Fred Holcomb, Woodbury & Co., Portland, Ore.; vice-president, R. W. deWeese, Electric Steel Foundry Co., Portland, Ore.; secretary-treasurer, H. F. Morrow, Pacific Metal Co., Portland, Ore.; chapter director, O. J. Ulrich, Pacific Machinery & Tool Steel Co., Portland, Ore.

Philadelphia Chapter

President, David Barbour, Barbour Bros. Steel Co., Inc., Trenton, N. J.; vice-president, Thomas Cal-

It's a HOT LIFE for Hose

FIGHTING BARNACLES!

Their hulls sprayed with an amazing plastic paint developed by the Navy to retard barnacle growth, ships can range farther, stay out of dry dock longer. But . . . the plastic paint has to be applied at a temperature of 300 degrees. So, using two inner braids of neoprene-coated Fiberglas yarn for reinforcement and special synthetic compounding, DeVilbiss developed a hose that withstood *400 degrees* to feed the material to the spray gun.

Spray Painting Air and Fluid Hose, Solvent-Resisting Hose, Service Station Hose, Gasoline Pump Hose, Welding Hose, Pneumatic Tool Hose, Fuel and Distillate Hose. DeVilbiss also makes a complete line of ingenious connections.

The ability of DeVilbiss to solve this problem stems from long-time concentration of engineering and research in the production of high quality hose. DeVilbiss entered this business to develop a hose for its spray painting systems that would better resist the destructive action of paints and solvents. The exceptional performance of the hose they achieved brought demands for types for many other purposes. And with the development of each, DeVilbiss technicians have added to a fund of specialized knowledge which today means that every hose bearing the DeVilbiss name will serve better and last longer in the particular work for which it is intended.

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lahan, Atlantic Steel Products Co., Philadelphia; vice-president, Alan Ainsworth, Horace T. Potts Co., Philadelphia; vice-president, J. J. Hill, III, Hill-Chase & Co., Inc., Philadelphia; secretary-treasurer, Ray P. Farrington, W. F. Potts, Son & Co., Inc., Philadelphia; chapter director, J. J. Hill, Jr., Hill-Chase & Co., Inc., Philadelphia.

Washington Chapter

President, J. C. Richards, Hunt & Mottet Co., Tacoma, Wash.; vice-president, John Robbins, A. M. Castle & Co., Seattle; secretary-treasurer, Arnold S. Allen, Jr., Seattle Hardware Co., Seattle; chapter director, Harold Barde, Barde Steel Co., Seattle.

Wisconsin Chapter

President, Carl Callauer, U. S. Steel Supply Co., Milwaukee; vice-president, George C. Heiden, Shadbolt & Boyd Co., Milwaukee; secretary-treasurer, Fred O'Dell, Edgar T. Ward's Sons Co., Milwaukee; chapter director, John Pritzlaff, John Pritzlaff Hardware Co., Milwaukee.

Wartime Steel Output In Japan in Peak Year Only 9,656,000 Tons

New York

• • • **Production of steel** in the Japanese Empire during the war years reached a peak in 1943, the American Iron & Steel Institute announced recently. Thereafter, as a result of the naval blockade and of bombings, it declined steadily.

According to a report of non-military activities in Japan and Korea, prepared recently at General Headquarters of the Supreme Commander for the Allied Powers, the peak wartime production of steel ingots in the Japanese Empire was 9,656,000 net tons in 1943, which was less than 11 pct of the maximum annual production in the United States during the war.

That 9,656,000 tons which Japan produced in the year 1943 could have been turned out by the steel mills of the United States in only 38 days, at the record rate of production which prevailed in the month of March, 1944, according to the Institute.

Of the total produced in Jap-controlled plants in 1943, about 8,616,000 tons, nine-tenths of the

total, was produced in plants on the home islands of Japan. The great steel works at Showa, in Manchuria, produced 921,000 tons and the remainder was produced at a plant at Keijiho in Korea.

The peak of steel production achieved in Japan during the war, although relatively small by American standards, nevertheless represents a substantial increase over prewar production. In 1930, for example, only 2,070,000 tons of steel were made in Japan. By 1937 output had risen to 6,991,000 tons and it rose steadily thereafter until 1943.

In 1944 steel production fell to 7,017,000 tons. A further, even sharper, drop was recorded after the start of intensive bombing of some of the major steel producing centers in Japan.

In 1941 a total of 4,136,000 tons of iron contained in iron ore were required by the Japanese steel industry. Only 20 pct of that was produced in the Japanese home islands; the balance, 3,317,000 tons, was imported.

As the naval blockade grew tighter and tighter, production of ore in Japan proper was nearly trebled, but the increase was nowhere near great enough to offset the sharp decline in imports of ore. By 1944 the iron content of imported ores added up to only 937,000 tons, less than 30 pct of the tonnage that had been imported in 1941.

Another apparent factor resulting in lower steel production was the exhaustion of Japan's stockpile of imported scrap which had been built up in the 10 yr preceding the outbreak of war with the United States as a result of large purchases in this country.

Approximately 1,800,000 tons of Japan's annual steel capacity was put out of production during the war by bombings, the report indicated.

The Tokyo area suffered the greatest loss, annual capacity there being cut back 440,000 tons, or 67 pct, as a result of bombing. At Kamaishi, on the northeast coast of Japan's main island, steel capacity was cut by approximately 230,000 tons a year. At Osaka 330,000 tons capacity was lost.

The losses in productive capacity in other areas were: Kobe, 252,500 tons; Wanishi, 220,000 tons; and Yawata, 165,000 tons.

German Flying Bombs Carried Televisors And Radio Controls

London

• • • **During the flying bomb age** over London and the South, there was much speculation as to the methods employed in controlling their distance and direction, according to T. K. Cordes, British technician. Many held the view that the bombs were radio-controlled, but few suspected that they also carried television apparatus to inform the despatch bases of their progress over England. That this was so seems evident from the reports, recently published, by teams of industrial experts, who visited Germany for the collection of scientific and technical intelligence from German industry.

These reports were compiled under the auspices of the British and Combined Intelligence Objectives sub-committees and covered practically all German research and developments.

One of the reports deals with German activities in the field of radio and controlled missiles in the Lyons area. The investigators, Capt. J. Z. Menard, Mr. Eugene Pack, and Mr. Lucien Farkas, were accompanied by M. Eugene Gibon, chief engineer for the Direction des Industries Mecaniques et Electriques, Ministere de la Production Industrielle.

Generally, and as expected, it was found that the Germans had not entrusted the French with the development or production of any very important equipment, nor had the French delivered any significant material to the Germans.

At the laboratories of Le Materiel Telephonique, several radar equipments were developed which displayed ingenious circuits and technique, though not up to the standards set by Allied equipment.

The Etablissement Cartex had considerable contact with German technicians and information was obtained concerning German radar activities; the location of manufacturers and research facilities; the effect of Allied counter measures and some indication of German knowledge regarding Allied radar.

The Germans approached this firm, "requesting" production of a radio frequency bridge, an instrument to work on frequencies of be-

tween two and four metres which, according to M. Nissen, engineer to the Cartex company, was needed by the Germans because the Allied use of "window" had effectively jammed the German 50-60 cm. radio chain, but had little effect on German radar operating on the 2-4 m band. The original model of this radio frequency bridge used a crystal detector which had to be changed to a diode valve because the sole German manufacturer of the crystals, a specialist in Berlin, had had his entire plant destroyed by Allied bombing.

It was also learned that the Germans used a coaxial cable with a 100 kilocycle carrier providing 30 telephone channels for carrier telephony. As many as 90 teleprinters were worked on one telephone landline. Standby facilities were provided, using radio relays thought to be in the dm band and spaced about 40 km apart.

La Radio Industrie was asked by the Germans in July 1943 to study the construction of a two-way television system for plane-to-ground operation, which was to be robust enough to withstand shock and be capable of operating at altitudes of 12,000 m with a temperature variation of between 40°C and –30°C. The instrument was to employ a 5-in. cathode ray tube with very fine definition. The project was considered very secret and a German engineer spent a considerable time with the company.

When the Germans announced that flying bomb attacks on England had begun, Lt. Kopler, a German radio technician, who was attached to the Wasserman research on frequencies and spent 2 yr on the German coast chain equipment, described it to M. Nissen as a bomb which carried a television device to send back to the control station a view of the terrain over which the bomb was passing. The control station then effected direction by means of frequency modulation.

Another manufacturer said he knew of trials conducted with 500 and 1000 kg radio-controlled bombs carried by aircraft and said to have an accuracy of 100 m. In one instance the bomb was controlled by means of a transmitter in the bomber plane and a radio transmitter-receiver set fitted in the bomb; in another, the control of the bomb, after release by the bomber plane was taken over by a nearby fighter in similar manner.

Gallup Polls

(CONTINUED FROM PAGE 121)

ance, as the following survey indicates:

"If a Congressman is elected on the Democratic ticket and does not vote with his party on all major issues, should he be prevented from running for office again as a Democrat?"

The vote of the whole country, and of Democratic voters only, follows:

	Yes Pct	No Pct	No op. Pct
National vote	21	69	10
Democratic voters only	25	64	11

An argument put forward by those who want party mavericks purged is that it is difficult if not impossible for a president in power to carry out any consistent program if there is no solidarity in his own party.

But the majority of voters seem to be more willing to accept that danger than to accept "outside interference" in local elections. Mr. Roosevelt tried unsuccessfully in 1938 to purge such men as Senator Tydings of Maryland, Senator George of Georgia, and "Cotton Ed" Smith of South Carolina, among others for failing to adhere to the Administration's program. U. S. Representative John O'Connor of New York, suffered defeat as a result of Roosevelt opposition at that time.

Public opinion surveys at the time indicated that many American voters resent having anyone outside their state or their Congressional district attempt to dictate their choice of Congressman or Senator.

Cargo Ship Bid Approved

Washington

• • • **Bethlehem Steel Co.'s** bid of $15,495,000 each for the construction of three 650 ft 22 knot passenger cargo ships to be built for the American Export Lines, Inc., has been approved by the Maritime Commission. The bid provides for delivery in 640, 746 and 854 days. Final award of the contract is subject to concurrence of the operator and contingent upon approval of his application for a construction subsidy now before the Commission.

The London Economist

(CONTINUED FROM PAGE 127)

that the division between the Fabian and revolutionary conceptions has become blurred. Moderate Fabian reformism requires for its political success a background of a stable society and a continuity in the functioning of parliamentary institutions. Germany today has none of these. On the other hand, European and German Communism no longer objects to participation in coalition governments with the center or right wing parties, which was once regarded by it as the original sin of the Socialists of the Second International. Some Germans now argue that Communism no longer makes a fetish of the dictatorship of the proletariat—although the experience of Eastern Europe does not bear this out—and they feel that the differences between Socialists and Communists do not lie in the sphere of Socialist doctrine but in the Communists' fanatical allegiance to Russia, their rigid inner party discipline and their addiction to police methods—three features which remain unacceptable to most Social Democrats. Nevertheless, many Germans believe that in matters of doctrine and program, the two parties have come sufficiently closely together to make their merger practicable.

It is especially in Germany that the argument in favor of the unity of labor arouses a strong emotional response. Nowhere has the labor movement as a whole paid so heavy a price for its internal feuds as in Germany. Nazism was the classical tertius gaudens; and in both parties this was realized too late in the day, when the battle against Nazism had been miserably lost. During the 12 yr of the Nazi regime, German Communists had a guilty conscience when they were reminded of their quixotic fight against "Social Fascism" on the very eve of Hitler's seizure of power. The Social Democrats felt equally guilty because of their policy of sitting back with folded arms in face of the Nazi onslaught. The vows of unity were repeatedly made by adherents of both factions between 1934 and 1945. Even a few months ago the appeal of unity was still so strong that both sides were repeating the vow.

The Russians played something of a trump card when they raised the issue a few months ago.

Equally clearly they have now overplayed their hand and wasted their trump. The revolt of a majority of Social Democrats in Berlin against the merger has been a reaction against the high-handed manner and the totalitarian police methods used in order to bring it about. In the Russian zone outside Berlin, Social Democratic opposition to the methods used has taken a different form. Many Social Democrats, seeing that they have no chance of maintaining their independent organization and unwilling to join the *Einheitspartei*, have swelled the ranks either of the Christian Democratic Union or, to a lesser extent, of the Liberal Democratic Party.

The Christian Democratic Union has found itself unexpectedly strengthened in a somewhat embarrassing manner. It has found itself infiltrated from two sides simultaneously. From the Right it has been invaded by former adherents of the German National Party and of the *Stahlhelm*, the old right wing groupings which merged with the Nazis in 1933 and have not been allowed to reappear on the political stage. The infiltration from the left by Social Democrats has been no less embarrassing because it has exposed the party to the accusation that it tries to sabotage the new *Einheitspartei*. Willy nilly the Christian Democratic Union has had to forbid its branches in the Russian zone to accept new members from the Social Democratic ranks. This tragicomic incident shows to what extent Russian policy has antagonized the Socialist rank and file.

The representatives of the Western Powers in Berlin have vetoed the merger insofar as it is being brought about by pressure and intimidation. The question is, however, whether negative opposition on the part of the British is likely to be really effective. The military government authorities were justified in issuing an official statement to explain that the message of 27 coming the merger did not represent the official view of the British Labor Party.

The statement might have come more suitably from Mr. Hynd's office, but it was obviously essential to dispel unfounded suspicions of British support for a forced merger, brought about by pressure and terror. Legally, too, the British authorities were within their rights in calling for the resignation of those Communists and Socialists from the British zone who had allowed themselves to be elected to the executive of the Einheitspartei, on the ground that the Einheitspartei does not exist in the British zone.

But one may ask whether a purely negative attitude is wise. It creates the impression in Germany that the British authorities are interested for reactionary and repressive reasons in preventing the unity of the working classes in Germany. The Communists will be the first to exploit the belief and it will serve

Estimated numbers employed in the British metal industries

Thousands

		Metal manufacture, metal goods, engineering, vehicle, aircraft and shipbuilding industries		
		Total	Males	Females
1939	June	2,716.7	2,289.6	427.1
1943	June	4,586.4	2,959.0	1,627.4
1945	June	3,828.2	2,577.8	1,250.4
	August	3,674.5	2,517.9	1,156.6
	September	3,501.2	2,444.6	1,056.6
	October	3,344.0	2,381.1	962.9
	November	3,272.0	2,356.0	916.0
	December	3,203.1	2,335.9	867.2

Source: Ministry of Labor and National Service.

their purpose well in campaigning for unity under their domination in the Western zones.

The really effective British reply would be to help the Social Democrats to seize the lead in the movement for working-class unity, at least in Western Germany. This would involve, of course, allowing them to realize their policy in such things as the socialization of heavy industry, land reform, the adoption of a rational plan for the Ruhr. Against such a background, the British authorities could say, "Discuss, pursue, work for genuine unity. Without terror, without pressure, in the freedom of atmosphere which only genuine social democracy can give you, hammer out your future. You may be sure it will have our backing if it is progressive, constitutional and free. In Britain, we have a united Labor Party. See if you can achieve a similar unity on the basis of the same freedom and tolerance." Such a reply would effectively challenge the totalitarian *Einheitspartei* in the Russian zone. It could help to forge a new and hopeful path for the German working classes. Any other reply—by repression, by banning discussion—will only aggravate the divisions, exasperate feeling and finally lead the British authorities into a position of opposing, backed by all too many Nazis and near-Nazis, a fusion which the Communists dominate and which is basically directed against the West.

WAA Gives New Listing Of Blast Furnaces And Coke Ovens for Sale

Washington

• • • **Thirteen blast** furnaces and several batteries of coke ovens, representing an original capital investment of $198 million by the government and possessing a potential capacity of 4,370,000 tons of pig iron a year, have been offered for sale or lease by War Assets Administration.

Strategically located in seven states, they are:

American Rolling Mill facilities at Houston, Tex., with annual production capacities of 480,000 tons iron ore, 276,000 tons pig iron, 447,000 tons steel blooms, 216,000 tons steel plate, 17,850 tons steel ingots, and 276,000 net tons of coke.

Lone Star Steel's facilities at Daingerfield, Tex., with ore rights for the bulk of more than 33,000 acres; monthly capacity is 81,000 tons iron ore concen-

British Motor Vehicle Production

Monthly averages

		Passenger cars (including taxis)			Commercial vehicles (including omnibuses)		
		Total	Service	Other	Total	Service	Other
1935		27,263	.....	.....	4,201	.....	.....
1944		175	149	26	10,904	8,421	2,483
1945	January	534	362	172	10,908	7,731	3,177
	February	565	420	145	9,847	6,884	2,963
	March	669	647	22	10,928	7,357	3,571
	April	648	526	122	12,097	7,611	4,486
	May	569	380	189	8,857	5,349	3,508
	June	508	388	120	9,820	5,695	4,125
	July	711	453	258	11,079	5,966	5,113
	August	566	144	422	6,591	3,672	2,919
	September	1,043	209	834	11,195	5,461	5,734
	October	1,822	150	1,672	9,255	3,556	5,699
	November	2,399	196	2,203	7,967	3,014	4,953
	December	6,904	231	6,673	13,923	3,180	10,743
1946	January	6,319	134	6,185	9,800	1,601	8,199

Source: Ministry of Supply and Aircraft Production.

trate, 36,000 tons pig iron, and 36,000 tons of coke.

Carnegie Steel's Braddock, Pa., facilities including two blast furnaces with combined capacity of 915,000 tons of pig iron annually.

Pittsburgh Steel's Monessen, Pa., plant with one blast furnace producing 1300 tons hot metal daily.

Pittsburgh Ferro-Manganese facilities at Chester, Pa., with capacity of 115,000 tons pig iron per year

Republic Steel's facilities at Youngstown including one blast furnace with capacity of 365,000 tons yearly.

Republic Steel's facilities at Warren, Ohio, including battery of 61 ovens producing 1484 net tons a day.

Republic Steel's facilities at Cleveland with an estimated capacity of 492,750 tons of pig iron and 480,000 net tons of coke.

Republic Steel's facilities at Gadsen, Ala., including a blast furnace producing 280,000 tons pig iron and 65 ovens with capacity of 1582 net tons of coke daily.

Inland Steel plant at Indiana Harbor, Ind., which includes two blast furnaces with annual capacity of 900,000 tons pig iron and 146 ovens rated at 3365 net tons of coke daily.

Coppers United facilities at Granite City, Ill., producing 40,800 tons pig iron and 26,700 tons coke monthly.

American Steel & Wire Co. facilities at Duluth which includes one blast furnace with estimated capacity of 266,000 tons of iron annually.

Detailed and technical information pertaining to disposals of these facilities may be obtained from Iron & Steel Branch, Industrial Div. of Real Property, War Assets Administration, Washington 25, D. C.

WAA Places Foundry, Iron Mine and Other Plants Up for Sale

Washington

• • • **The government-owned** Pittsburg, Calif., steel foundry and an iron mine located at Ringwood, N. J., have been put up for lease or sale by War Assets Administration. The foundry has two 25-ton open-hearth furnaces and other equipment to provide a capacity of 30,000 tons of heavy steel castings annually. The mine, operated by the Alan Wood Steel Co., has a yearly production of 50,000 tons of lump ore and 350,000 tons of high grade ore concentrate.

Other recent offerings by WAA include the following (names of wartime operators given for identification):

Bendix Aviation Corp. ignition and accessories plant at Sydney, N. Y.; two Worthington Pump & Machinery plants at Buffalo, one making auxiliary turbine gear units and the other equipped for general machine work.

Remington Rand plane propeller plant at Johnson City, N. Y.; Schweizer plane parts and glider assembly plant at Elmira; Barr Mfg. Co., light manufacturing plant at Weedsport, N. Y.

Corod Minerals zinc-lead-fluorspar milling plant at Marion, Ky.; Southern Ferro-Alloys 45,000-ton ferrosilicon plant at Chattanooga; a portion of the Aluminum Ore Co. alumina plant at Mobile, processing 50 tons of low-alumina-content red mud an hour.

Tennessee Products ferromanganese plant at Rockwood, Tenn., for possible manufacture of pig iron, with coal and iron ore deposits on the 15,000 acre site; Commercial Solvents anhydrous ammonia plant at Starlington, La., with capacity of 200-tons a day.

New England Lime's 10-million-lb magnesium plant (ferrosilicon process) at Canaan, Conn., and a portion of International Minerals magnesium plant at Austin, Tex.

Five ordnance properties—Atlas Powder's sulphuric and nitric acid plant near Paducah, Ky.; Atmospheric Nitrogen's ammonia plant at Henderson, Ky.; Atlas Powder's TNT and DNT plant near St. Louis; Sherwin Williams' ammunition-loading plant at Carbondale, Ill.; and duPont's powder-TNT-DNT plant at Millington, Tenn.

An aluminum foundry, a magnesium smelter, and a steel foundry, all operated by Ford Motors and located in the River Rouge section of Dearborn; and General Electric's bombsight plant at Easthampton, Mass.

General information may be obtained from WAA headquarters in Washington, or technical and detailed data from the regional WAA office nearest the plant location.

Zeiss Patent Licenses Available Through APC

Washington

• • • **Alien Property Custodian** James E. Markham has announced the availability for license of patents on precision measuring instruments formerly held by Carl Zeiss. For an administrative fee of $15 each, licenses are issued by the Custodian on a royalty-free, nonexclusive basis.

Included in this group of German inventions, Mr. Markham said, are instruments for testing the pitch of threads, cylindrical end gages, depth gages, and other devices.

Specifically, the Custodian explained, the Zeiss patents cover a measuring device (1,703,120), feeler gage with handle (1,726,129), measuring drum for screw micrometers (1,985,061), instrument for testing the pitch of threads (2,004,225), and the supporting gageplate for the measurement of dimensions of bodies rounded by parallel surfaces (2,026,374).

In addition to the above patents, four Zeiss patents on related instruments have expired and are open for use without a license. They are cylindrical end gage (1,559,801), measuring apparatus (1,657,326), caliper gage (1,671,168), and depth gage (1,679,473).

Complete licensing data may be obtained from the Office of Alien Property Custodian, Washington 25, while copies of the patents may be secured only from the Commissioner of Patents, Washington 25, for 10¢ each, payable by money order or certified check.

U.K. Increases Prices

London

• • • **Maximum prices** which U.K. consumers will pay for copper have been raised by $35.60 per ton, lead by $21.36, zinc and zinc sheets by $28.48, and zinc oxide by $24.92, under a new British Ministry of Supply order. Licenses will in future be required for additional deliveries of lead.

These increases will now bring the maximum price of copper in the U.K. to $256.32 per ton, lead to $160.20, and the cheapest grade of zinc to $139.73.

The announcement of the price advances was not accompanied by any explanation by the Ministry of Supply, or any indication as to the relationship of the new prices to British government prices.

How Lebanon

Ⓛ 19... Ⓛ 22... Ⓛ 205

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Service Requirements

IN selecting casting alloys for low temperature service, it is especially important that information about physical properties be reliable. The charts shown are based on information gained during Lebanon's long experience in producing castings for service at temperatures ranging from 32° F. to −300° F. ... and upon Lebanon's extensive investigations in the field of low temperature operations.

Lebanon produces two types of casting materials for use at low temperatures: ferritic steels for service to −150° F. (Circle Ⓛ 19 and Circle Ⓛ 205); austenitic steel for service below −150° F. (Circle Ⓛ 22). Accurate information on the impact properties of these three steels is presented on the charts opposite. All data is influenced by variables in design, section variations and gradients.

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